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Global Alliance for Clean Cookstoves

Vietnam Market Assessment

Sector Mapping

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Accenture Development Partnerships

April 2012

Introduction

- This Market Assessment was conducted by Accenture Development Partnerships (ADP), the not-for-profit arm of the global management consultancy, Accenture, on behalf of the Global Alliance for Clean Cookstoves (the Alliance).
- It is intended to provide a high level snapshot of the sector that can then be used in conjunction with a number of research papers, consumer surveys and other sources (most published on the Alliance's website) to enhance sector market understanding and help the Alliance decide which countries and regions to prioritize.
- It is one of sixteen such assessments completed by the Alliance to:
  - Enhance sector market intelligence and knowledge.; and
  - Contribute to a process leading to the Alliance deciding which regions/countries it will prioritize.
- Full slate of market assessments include studies in: Bangladesh, Brazil, Colombia, East Timor, Ethiopia, Ghana, Indonesia, Kenya, Mexico, Nigeria, Peru, Rwanda, South Africa, Tanzania, Uganda and Vietnam.
- Each assessment has two parts:
  - Sector Mapping – an objective mapping of the sector.
  - Intervention Options – suggestions for removing the many barriers that currently prevent the creation of a thriving market for clean cooking solutions.
- In each Alliance study a combination of ADP and local consultants spent 4-6 weeks in country conducting a combination of primary (in-depth interviews) and secondary research. They used the same Market Assessment 'Toolkit' for each country so that comparisons can be made. The Toolkit is available free of charge to all organizations wishing to use it in other countries.
- **The Alliance wishes to acknowledge the generous support of the following donors for the market assessments: *Barr Foundation, Dow Corning Corporation, Shell Corporation, Shell Foundation,* and the governments of *Canada, Finland,* and *Spain*.**

This market assessment was produced by Accenture Development Partnerships (ADP) on behalf of the Alliance. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of the Global Alliance for Clean Cookstoves or its partners. The Alliance does not guarantee the accuracy of the data.

Content

Sector Mapping Summary (1/2)

Vietnam is well on its way to becoming a middle-income country by 2020, having made incredible economic strides across the board in the past decades. GDP increases of 18% per year have sustained until recently due to progressive economic opening and modernization, and Vietnam is expected to meet most of the MDGs prior to 2015, including those around relative gender equality. Despite these significant gains, 46.4% of people still rely on solid fuel for cooking, causing 10,600 deaths per year.

Despite this ongoing issue, there has not been much interest in the funding of end-to-end, full-scale ICS programs by either the Government or NGOs. Most programs are small in scale (under 1000 cookstoves, sometimes as low as 40) and focus on demonstration and design. Two examples of large scale projects do exist, with the influential rural distribution organization, Vietnam Women's Union, having distributed 29,300 cookstoves in the North, and SNV's Biogas program having the goal of installing 140,000 biogas digesters from 2003-2012.

Smaller cookstove components have been integrated into the broader renewable energy, deforestation, food security/cropland salinization programs. This has led to many cookstove researchers being involved in biomass energy production, biochar production, or sustainable forest initiatives. With a relatively undeveloped private sector, this locally-relevant innovation finds it difficult to make the leap to market-based solutions in the consumer market.

In general, the challenge in creating a self-sustaining market in Vietnam lies around effectively managing a highly fragmented and adolescent industry sector. It is somewhat difficult to find improved cookstove manufacturers, marketers, and service providers to produce, sell, and service the cookstoves. That being said, there is little issue with distributing to the last mile in Vietnam, other than cost, with the Women's Union having reached many locations, and the government and local and international NGOs continuing to provide support.

Sector Mapping Summary (2/2)

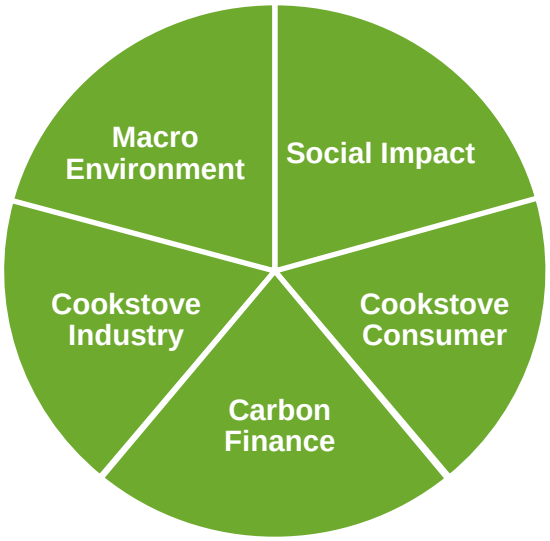
	Findings
Social and Environmental Impact	Solid fuel usage and the associated health impact in Vietnam is highly dependant on income (above $50/mth, people use LPG) and location (rural more than urban). That being said, people generally do not spend a high portion of their income on fuel, and can largely afford a cookstove purchase as required. Recent local innovations in cookstoves are therefore working to additionally address supplemental environmental concerns such as food security, deforestation, and emissions.
Consumers	The segment most in need of ICS are the highly inaccessible and largely ethnic groups in the North. However, this segment is expensive to reach, relatively small and shrinking every day. The true challenge is to reach the highly demanding 9 million rural households and farmers that are leapfrogging to new living standards. These consumers need cookstoves to be functional, affordable, and aspirational products that they are as proud to own as their new satellite TV.
Cookstove Industry	With no standards or leading cookstove organizations, the value chain is highly fragmented. Multiple design innovations in portable biochar cookstoves have linked with government institutions and NGOs for conducting distribution pilots and are largely able to reach to the last mile. However, there is a gap in the private sector market, where there are no identified factories producing at scale, private marketing efforts, integrated maintenance programs, or ICS suppliers known to have made a sustainable profit.
Carbon Financing	Most carbon financing is industrial in Vietnam, with no cookstove programs. However, several relevant projects involving biogas and biomass are in the process or have been registered with the CDM, and there are experienced organizations operating in Vietnam. The future will have to rely on the voluntary market.

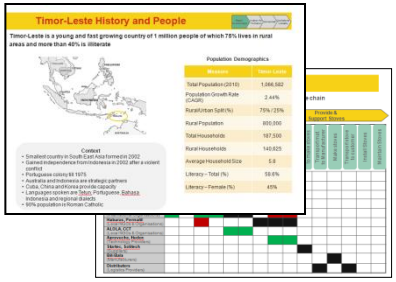
Content

Project Approach

A structured approach first assessed the market for a cookstove industry and then used the sector mapping output to develop the intervention options and relative roadmap

Sector Mapping

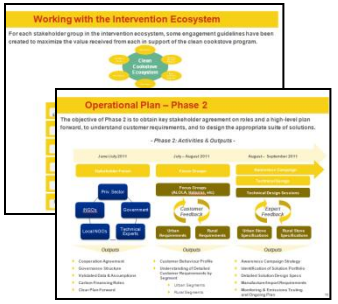




Sector Map

Strategy Development

Identify Intervention Themes → **Develop Recommendations** → **Develop Relative Roadmap**



Intervention Options And Relative Roadmap

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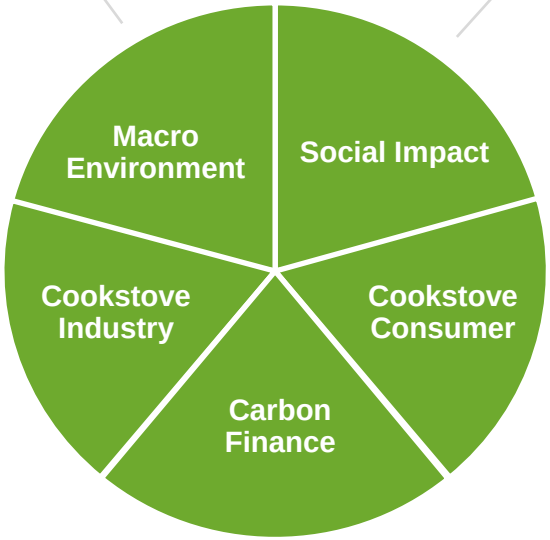
Sector Mapping Approach

Sector Mapping of the cookstove sector was conducted across five dimensions:

- *Social:* What is the country demographics & population distribution across regions?
- *Political:* How stable is government & what political risks will any program face?
- *Economic*: How much money do our potential customers have & what is the economic cycle?
- *Technological*: How sophisticated is the infrastructure & what is the plan for progress?
- *Environmental*: How do ecological conditions impact the success of cookstove programmes?
- *Gender:* How does gender play a role in clean cookstove use and purchase?



- How do people cook and what fuels are used in the region?
- What is the current IAP exposure profile of our target market? (Primary cause of IAP and size of problem)
- What are the other impacts caused by the use of poor cooking cookstoves?
- How does the impact of cookstoves stack up against other health & social priorities?

- What cooking devices are currently used within the region?
- Who are the main players active in the cookstove sector?
- What are the opportunities / threats for current & future cookstove programmes?
- How commercially attractive is the sector & what are likely to be some of the industry challenges?

- What carbon financing options exist for the country?
- What structures exist which can be leveraged for future carbon financing components?
- Which entities are likely to fill the required roles in the carbon finance operating model?

- What is the profile of the target population?
- How can the customer population be segmented / categorized?
- How big is each customer segment and what are its characteristics?
- What are the specific needs of each customer segment?

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Intervention Options Approach

Intervention development was conducted by using sector mapping as input to identify intervention areas, develop recommendations and develop a high level roadmap

Sector Mapping

- Favorable and unfavorable factors contributing to development of a cookstove industry on following dimensions:
  - Macro Environment
  - Indoor Air Pollution
  - Consumer
  - Current Cookstove Industry
  - Carbon Finance

Intervention Themes Identification

- Identify possible interventions to promote a clean cookstove industry by:
  - Addressing the unfavorable factors
  - Aligning with the favorable factors

Intervention Development

- Customer Segment Strategy:
  - Identify appropriate technology to serve each customer segment
  - Develop holistic customer strategy including marketing, financing
- Overall Strategy
  - Develop strategy for stakeholder engagement across segments
  - Develop strategy for awareness raising across segments
  - Identify possible NGOs & programs to partner with

Relative Roadmap

- Develop a high-level, long term directional plan that includes:
  - Indicative relative timing of initiatives
  - Dependencies between initiatives addressed
  - Rough assessment of time to complete initiatives
  - Short activities and milestones

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Acknowledgements

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Sustainable Rural Development
SNV
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AIP Foundation
Making Roads Safe
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geres Cambodia
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Content

Social Environment

Vietnam is still largely rural (71% of the population), but is quickly becoming one of the largest middle income countries with ~87 million people living in ~23 million households, and over 16 million having risen out of poverty since 1998

Context

- Vietnam has a long history of ruling influence of foreign powers, ending in 1973 with the ceasefire agreement and withdraw of US armed forces.
- North and South continue to have different cultures and climates
- 80% of the population is under age 40 and therefore has no memory of war
- Official Language: Vietnamese
- No Religion 80.8%, Buddhist 9.3%, Catholic 6.7%

Population Demographic	Vietnam
Total Population (2010)	86,936,464
Population Growth Rate (CAGR)	1.054% (2012 est.)
Rural/Urban Split (%)	71% / 29%
Rural Population	61,898,763
Total Households	≈22,628,000
Rural Households	≈15,826,985
Average Household Size	3.8
Literacy – Total (%)	94%
Literacy – Female (%)	92%
Life Expectancy (years)	72.4
Population below poverty line	14.5% (2008)

This has improved from 37.4% in 1998

- Implications -

While still very rural, an increasingly richer population has high aspirations and expects a higher level of performance from their household products

Source: World Bank Development Indicators and CIA World Factbook, Vietnam 2009 Census, http://www.ipedr.com/vol20/10-ICHSC2011-M00023.pdf

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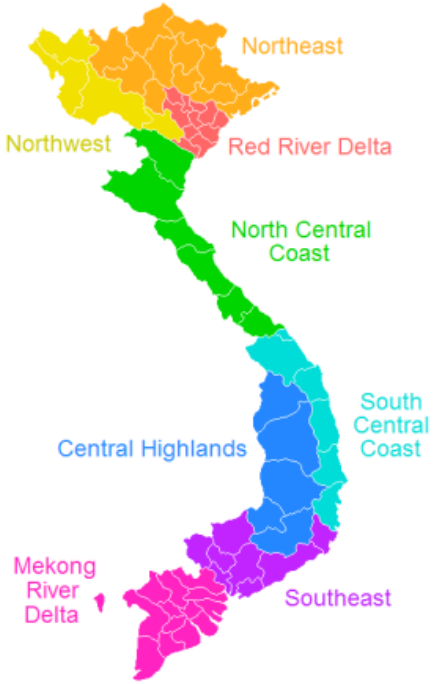
Political Environment

While Vietnam is a communist state with a top-down governance approach, it is becoming increasingly decentralized

Administrative Map

- Country divided into 64 provinces with 15 cities – more than 10x the number of provinces of China or India
- In a **steady increase in decentralized governance**, the number of provinces has increased 60% since 1990
- Population density is high at 253 persons per km^2



Political Structure

- Communist State
- President elected by the National Assembly from among its members for five-year term; last election held July 2011
- Prime minister appointed by the president

Current Government

- The Communist Party of Vietnam is the only party recognized by the government

Working with the Government

- Partnership with a cooperative government agency (national as well as local) is critical to navigating the complex political and regulatory environment of Vietnam.

- Implications -

It is critical to a successful rural program to have both national and local government cooperation, though it is not necessary for government to fund or spearhead the initiative

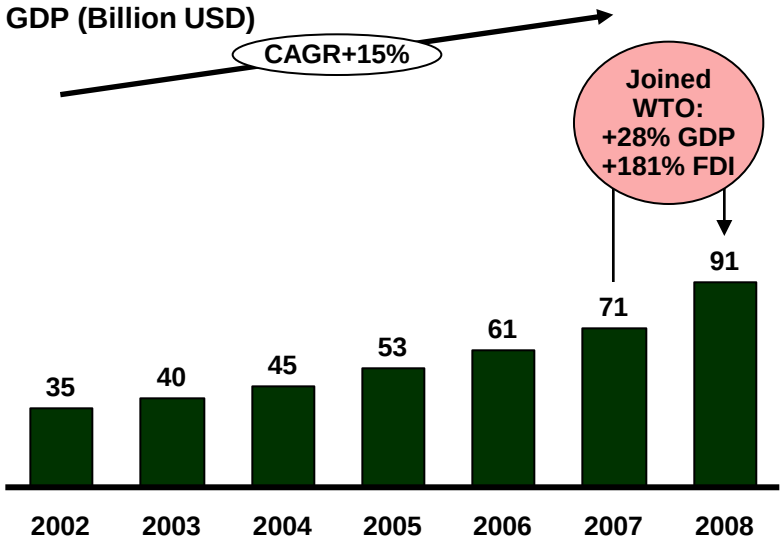
Source: World Bank Development Indicators and CIA World Factbook, Transparency International, Interviews, UNDP Energy & Poverty Vietnam

Economic Environment (1/2)

Vietnam is growing quickly, catapulting itself up the ranks to a lower-middle income country

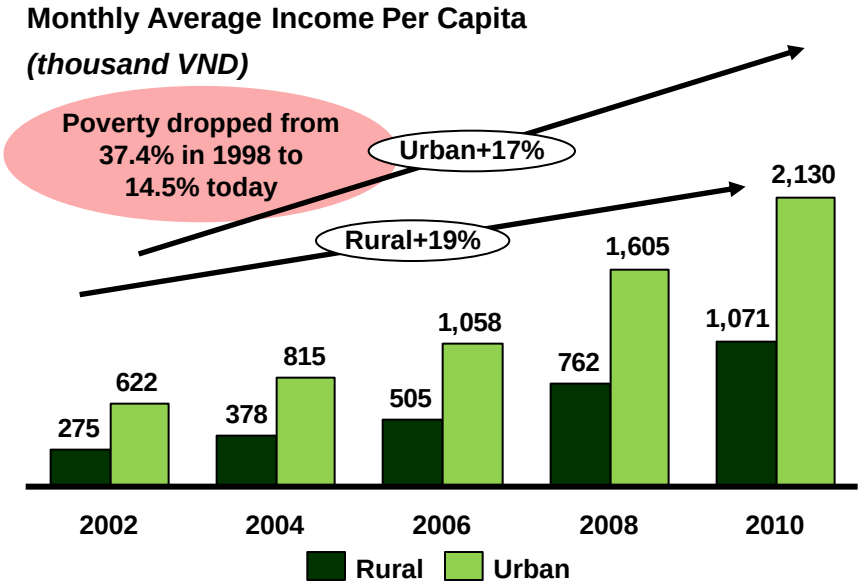
Vietnam is growing quickly

Vietnam's solid economic growth is driven by the 'doi moi' policy (committing to increased economic liberalization and modernization) and the entry to the WTO



The population is getting richer

Despite continued dependence on agriculture, Vietnam is leapfrogging large chunks of both its urban and rural population out of poverty



Key Economic Indicators	GDP (2010)	GDP/ capita (2010)	Economic Growth Rate	Unemployment	Exports/ Imports
	$106.4 billion	$1224 ($3205 PPP)	6.8% (2010)	2.4%	2nd largest exporter of rice

Source: World Bank Development Indicators & CIA World Factbook, Nielsen, Vietnam GSO, GSO Living Standards Survey

Economic Environment (2/2)

While Vietnam is improving as a place for business, it still has fundamental economic issues including inflation challenges

Its improving as a place for business

While rankings are still relatively low, Vietnam has shown consistent improvement in creating an environment that fosters private business and market solutions

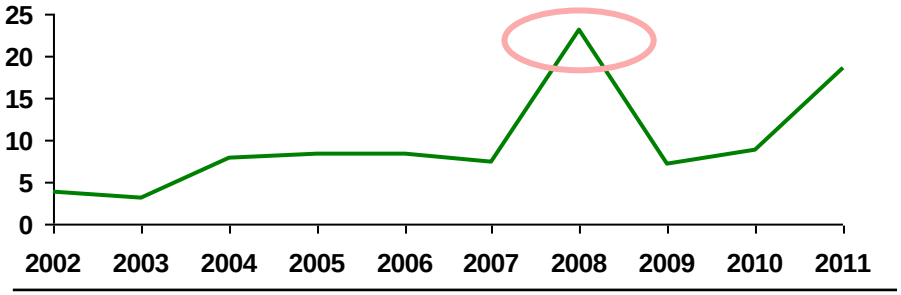
But it will have to address inflation and earnings discrepancies

Vietnam needs to ensure growth remains stable and steady for all sectors of the population

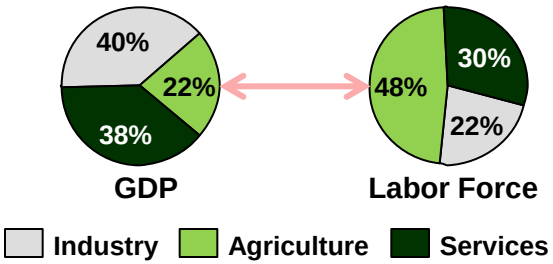
Ease of Doing Business Rankings

Metric	2005	2010	% Change
EIU Risk Rating	57	56	+2%
Corruption Perception Index	2.6	2.7	+4%
Failed States Index	84.9	76.9	+9%
Index of Economic Freedom	48.1	51.6	+7%
Human Development Index	0.540	0.572	+6%
Global Competitiveness Index	3.37	4.24	+26%

Inflation (Consumer Price %)



Sector Composition



- Implications -

Vietnam will be favorable to a cookstove program that assists in promoting the growth and capabilities of private industry, diversifies the economy, and/or reduces inflation

Source: World Bank Development Indicators & CIA World Factbook, EIU, Transparent International, HDI, GCI

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Gender

With high education and available micro financing, women have increasing opportunities, though gender roles still discourage them from participating in politics, leading businesses, or owning land

Policy & Employment

- Law on Gender Equality, 2006 is an effort to close the gender wage gap. In 2007, the Law on Domestic Violence Prevention and Control was passed.
- Women's liberation movement drove today's high labor force participation (74%)
- The Vietnam Women's Union, one of the strongest rural organizations, has over 13 million members
- Microfinancing will be available to 80% of rural women by 2015

Cultural Background

- Female-headed households are particularly affected by high and rising food and energy costs (20% of all HH)
- Family-based violence is little discussed, as it is culturally accepted, with nearly 30% of women having experienced it within the last year, and 58% in their life
- Gender based violence perpetrated by strangers is rare and largely unreported

Gender Equality Statistics

	Male	Female
Primary school attendance	96%	91%
Secondary school attendance (net)	80%	78%
Representation in National Assembly	74.24%	25.76%
% of Entrepreneurs	75%	25%
Literacy	96.1%	92%
Gender Inequality Index Rating	128th/187 (Medium)	
Income Ratio	116th/182	

- Implications -

Cookstoves programs can take advantage of women's easy access to capital to spur entrepreneurship in the industry

Source: World Bank, Vietnam National Women Congress 2007, OXFAM Responding to Climate Change in Viet Nam, UNDP HDR, UNICEF, WHO- Gender Based Violence in Vietnam, FAO

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Ecological Environment

With its dependence on rice and agriculture, Vietnam is extremely concerned about the impact of climate change on its forests and crops

Climate

- Tropical monsoon-type climate with hot & rainy summers & dry winters and high humidity. Cooler, cloudy, and more mountainous north with a hot, flat south
- GHGs are not monitored in sufficient granularity by sub-sector
- ADB estimates impact of climate change on real GDP will reach 1-3% by 2050
- Vietnam is an 'extreme risk' country in the Climate Change Vulnerability Index

Deforestation

- Though Vietnam increased its forest cover from 27% to 40% from 1990-2009 through plantation, it has been losing primary forest and logging and slash-and-burn agricultural practices contribute to deforestation and soil degradation
- UN-REDD program Phase 1 has increased awareness of deforestation and helps to convince local communities to save the forest

Saline Intrusion

- Extensive saline intrusion is experienced during regular flooding and a significant increase is predicted by 2050, when close to 60% of HCMC's agricultural lands are expected to be affected by increased salinity.

Other Environmental Issues

1. Overfishing
2. Urban environment degradation
3. Extreme weather (flooding and drought)

- Implications -

Cookstoves gain attention for their part in reducing GHG emissions and deforestation and could be integrated as part of a REDD or carbon emission reduction program

Source: Guidevietnam.com, CIA Factbook, ICEM.com.au, UN Vietnam Climate Change Factsheet , Interviews

Infrastructure and Priorities

Vietnam is progressing toward the goal of becoming a middle income country by 2020

Government Priorities

Socio-Economic Development Strategy (SEDS) 2011-2020 lays foundations for Vietnam to become a modern, industrialized society by 2020

- It gives attention to structural reforms, environmental sustainability, social equity, and emerging issues of macroeconomic stability.
- It defines three "breakthrough areas":
  - Promoting human resources/skills development (particularly skills for modern industry and innovation)
  - Improving market institutions
  - Infrastructure development. The overall goal is for Vietnam to lay the foundations for a modern, industrialized society by 2020.

Current Situation

Healthcare	Telecommunication	Energy	Transportation
• Vietnam has met the MDGs for Malaria control • After being a government priority for the past decade, access to water with improved sanitation is 94%	• Mobile phone penetration is 37% rural, 58% urban, with up to 74% in HCMC & Hanoi • 27% internet penetration, with 40-60% penetration in urban areas • Rural TV ownership doubled from 46.5% in 1999 to 84.9% in 2009	• Total energy demand will reach 250000 KTOE by 2030, currently at 10000 • Vietnams current energy usage and production is approximately equal, meaning Vietnam will need to import energy starting very soon • 50% to 88% electricity penetration, 1996-2004	• 84% of Vietnam's roads are paved • As of 2004, still 17% of the population did not live within 2km of an all-weather road • Waterways are attractive for transporting heavy goods

- Implications -

As Vietnam focuses on progressing to middle income country status, cookstove programs will have to address concerns about poverty alleviation and contribute to the energy deficit

Source: INSEAD, World Bank Development Indicators, ITU, UNESCO, Vietnam 2009 Country Census, talk.onevietnam.org, UNDP, WHO, ADB Conference

Millennium Development Goals - Vietnam

Vietnam has made impressive progress towards the MDGs, even meeting some of them far ahead of 2015. However, it needs to keep up the pace, anticipate risks, and target rising disparities

Eradicate Extreme Poverty and Hunger

✓5 years early

The biggest success for Vietnam has been in rapidly reducing poverty 75% from 1990 to 2008, where it was only 14.5%. This goal has been met over five years early.

Achieve Universal Primary Education

This goal is essentially met, with 97% primary school enrollment in 2009. This holds true across urban/rural, and across genders

Promote Gender Equality and Empower Women

Girls now represent 48.1% - 49.1% of students enrolled from primary to upper secondary level. Viet Nam also has one of the highest rates of representation of women in national parliament in the region: 25.8%

Reduce Child Mortality

Viet Nam has already achieved the targets for both under-five mortality and infant mortality, with both these rates being halved between 1990 and 2006

Improve Maternal Health

Maternal mortality has declined considerably over the last two decades, from 233 per 100,000 live births in 1990 to 69 per 100,000 live births in 2009

Combat HIV/AIDS, Malaria and Other Diseases

HIV rate is very low at 0.28 per cent for all age groups in 2010 and it has already reached its goal on malaria control. It also has done a good job dealing with SARS, Bird Flu, and Swine Flu

Ensure Environmental Sustainability

Biggest Challenge

There is good commitment at the policy level, and there has been impressive reforestation. However, there are important strides still to be made, particularly around water and sanitation and climate change

Develop a Global Partnership for Development

Viet Nam has made major strides in developing global partnerships for development since 2000, including joining the WTO, expanding cooperation with ASEAN, and serving a term on the UN Security Council

Sources: http://www.undp.org.vn/mdgs/viet-nam-and-the-mdgs/

Content

Cooking Habits

Although regional & income differences exist, cooking habits across Vietnam are similarly quick, with a high percentage of cooking fuel in the North going to economic pursuits of pig farming and tea/wine making

Type of Food

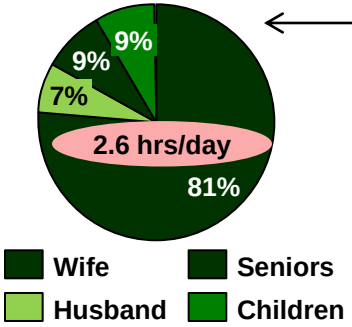
Quick, Fresh Food

- Food is fresh:
  - Fresh or slightly boiled herbs and vegetables are the staple of every meal, as are dipping sauces
  - Meals require little cooking time, being centered around noodle soups, rice, and briefly cooked meats or fish
- Few Regional Differences
  - Flavors differ from North to South, but cooking style is similar
- Drinking culture
  - There is a strong culture of drinking tea and rice wine, both of which take a long time to dry or ferment, respectively

Drying Tea

Cooking Habits

Who is the HH Cook?



- Over 80% of cooks are women in Rural Northern Vietnam
- Only 2.6hours are spent cooking per day for all three meals
- Cooking is generally done indoors or in a separate kitchen (92%) or to heat the house indoors in the North (11.8%)
- 40% of houses have two cookstoves for different purposes
- The 2nd cookstove is used by 42% to cook pig feed (only in the North)

Cooking Pig Food

- Implications -

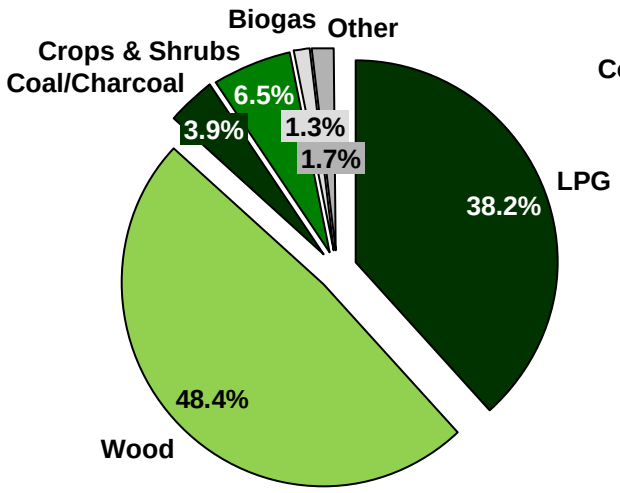
Cookstoves need to address consumer's need for quick convenience on the one hand with the expense of long cooking times required for farm operation

Sources: Interviews, Wikipedia, SNV Survey on Cookstove Usage

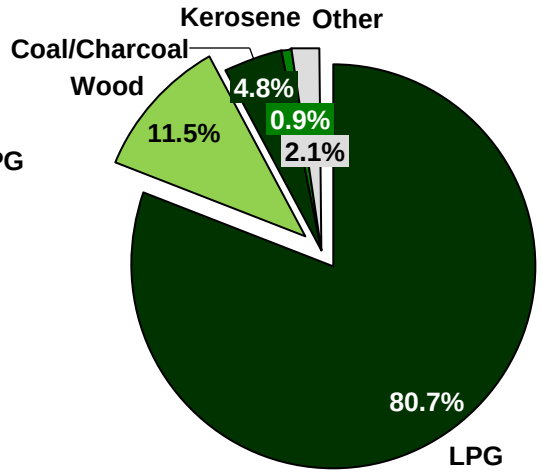
Fuel Usage & Availability (1/2)

Fuel usage is highly correlated to income, with the population moving decidedly to LPG as soon as they can afford it

Dominant Rural Fuel Use



Dominant Urban Fuel Use



Fuel Use and Availability

- Biomass: Wood is used predominantly in plentiful Northern, forested regions and more crop residue in southern areas.
- LPG: is an aspirational fuel, with 61% of current iron cookstove users listing LPG as their next cookstove purchase
- Biogas: A big NGO and government push toward Biogas has been made for its role as a renewable energy source, but it still only has very low penetration of 1.7% in rural areas
- Coal: The dangers of coal use indoors receives a disproportionate amount of attention due to recent publicized deaths due to coal smoke inhalation in Hanoi

- Implications -

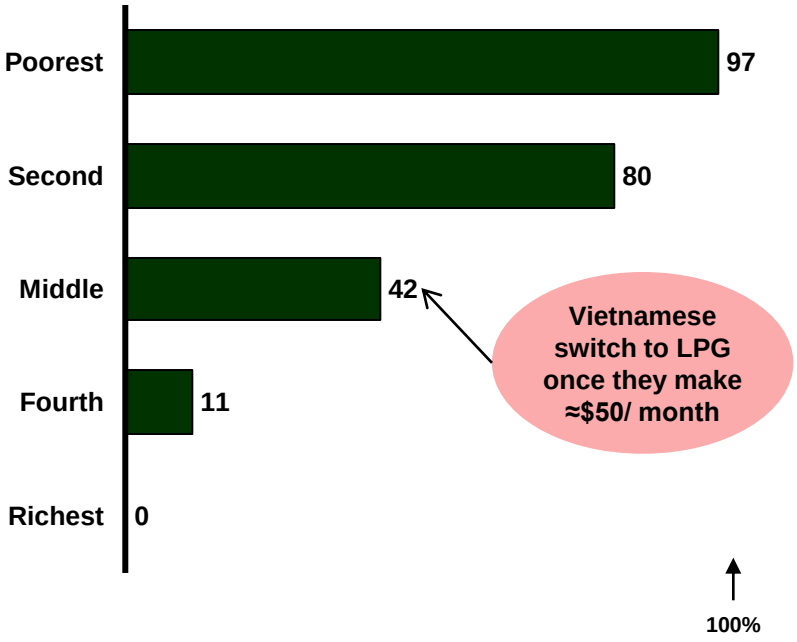
It is critical for cookstoves programs to reach the last mile and disadvantaged populations, as this is where the biggest persistent need will be when the population continues to get richer

Source: GSO Multiple Indicator Cluster Survey 2011, GSO Living Standards Survey 2010, SNV Cookstove Survey, Interviews

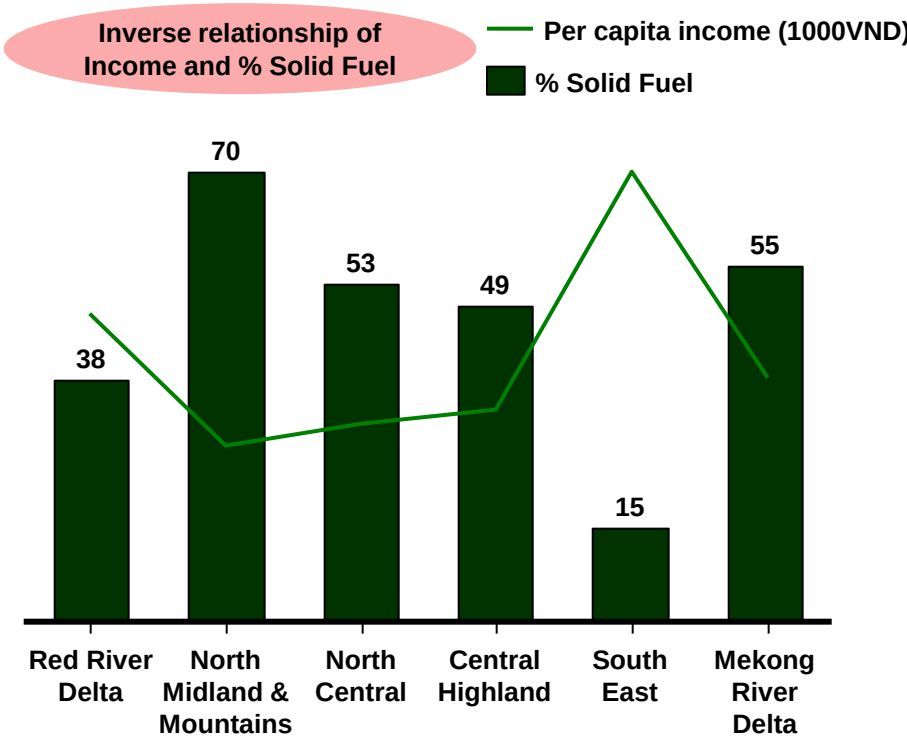
Fuel Usage & Availability (2/2)

Fuel usage is highly correlated to income, with the population moving decidedly to LPG as soon as they can afford it and solid fuel usage concentrated solidly in the bottom 50% of the population

% Solid Fuel Use by Income



% Solid Fuel Use by Region



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Source: GSO Multiple Indicator Cluster Survey 2011, GSO Living Standards Survey 2010, SNV Cookstove Survey, Interviews

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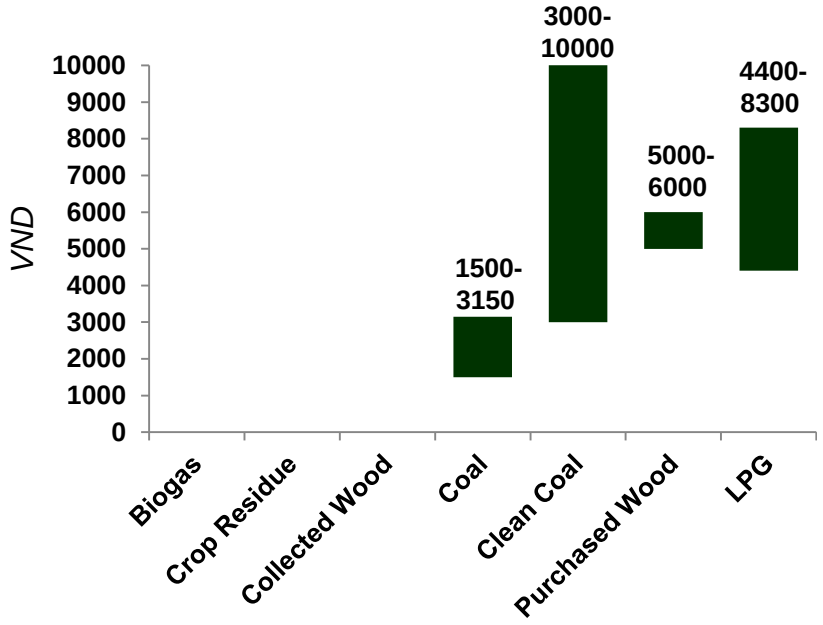
Available Fuel Cost

LPG is the most preferred fuel source, but price increases make it more and more financially out of reach for many, who turn to coal or collected firewood for most meals

Fuel Cost per Average Meal



Assumptions

- LPG based on a range of 400-500,000 VND per 12kg tank, 2 meals per day, tank lasts 45-60 days
- 1 Briquette required for 1 meal both clean and standard coal

Fuel	Unit Price	Fuel	Unit Price
Crop Residue/Wood	Free (no evidence of market price)	*Coal*	1500 – 3150/ briquette
Biogas	No variable cost once system is installed	*Clean Coal*	3000 – 10000/ briquette
Wood	10,500/day	*LPG*	400,000 – 500,000/ 12kg tank

Prices in Vietnamese Dong

Pricing and Supply Observations

- Recent increases in LPG cost have caused urbanites to turn back to coal. To combat this, the Vietnamese government has suspended the 5% import duty for LPG as of March 2, 2012. In response, members of the Vietnam Gas Association agreed to reduce the price by 46,000 VND/ Tank
- In addition to free gas, Biogas users experience a reduction of 84,000VND in household fertilizer expenses due to bio slurry use

"Lan Anh in Cau Giay district said that she has shifted to use coal cookstoves after the gas price skyrocketed to approximately 500,000 dong per 12 kilo tank" **VietnamNet, Feb 20, 2012**

- Implications -

Price is the #1 driver in fuel choice, meaning that switches to cleaner fuels will happen naturally as soon as they are competitively priced to coal

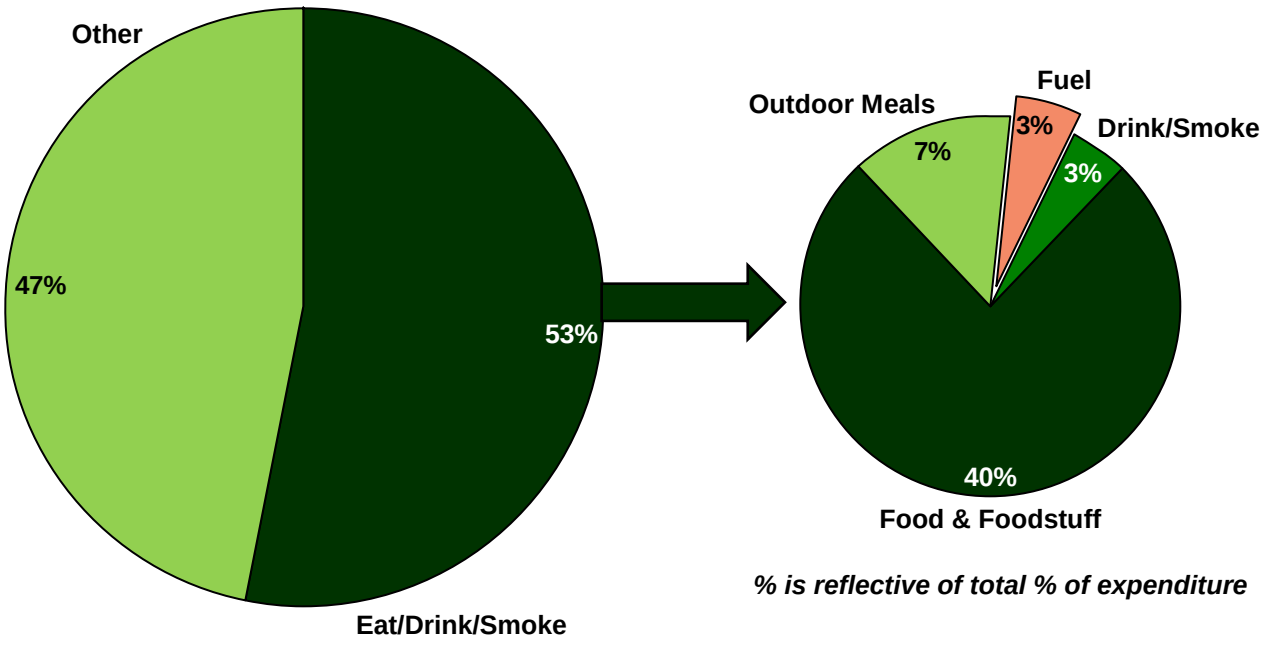
Source: Interviews, Action for the City Report http://english.vietnamnet.vn/en/environment/19007/gas-price-skyrockets--urbanites-use-honeycomb-coal.html. SNV Biogas User Survey, http://online.wsj.com/article/BT-CO-20120302-705054.html, http://businesstimes.com.vn/cooking-gas-distributors-agree-to-cut-prices/

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

Livelihoods (1/2)

Fuel as a percentage of expenditure is not significant, with the maximum % of expenditure across segments being 4%

Fuel as a % of Consumer Expenditure (2008)



- Fuel as a percentage of expenditure does not vary significantly across segments:
  - 4% of expenditure for the poorest to 2.3% for the richest
  - 3.2% Rural/ 2.6% Urban
- Fuel expenditure does not vary greatly across geography

- Implications -

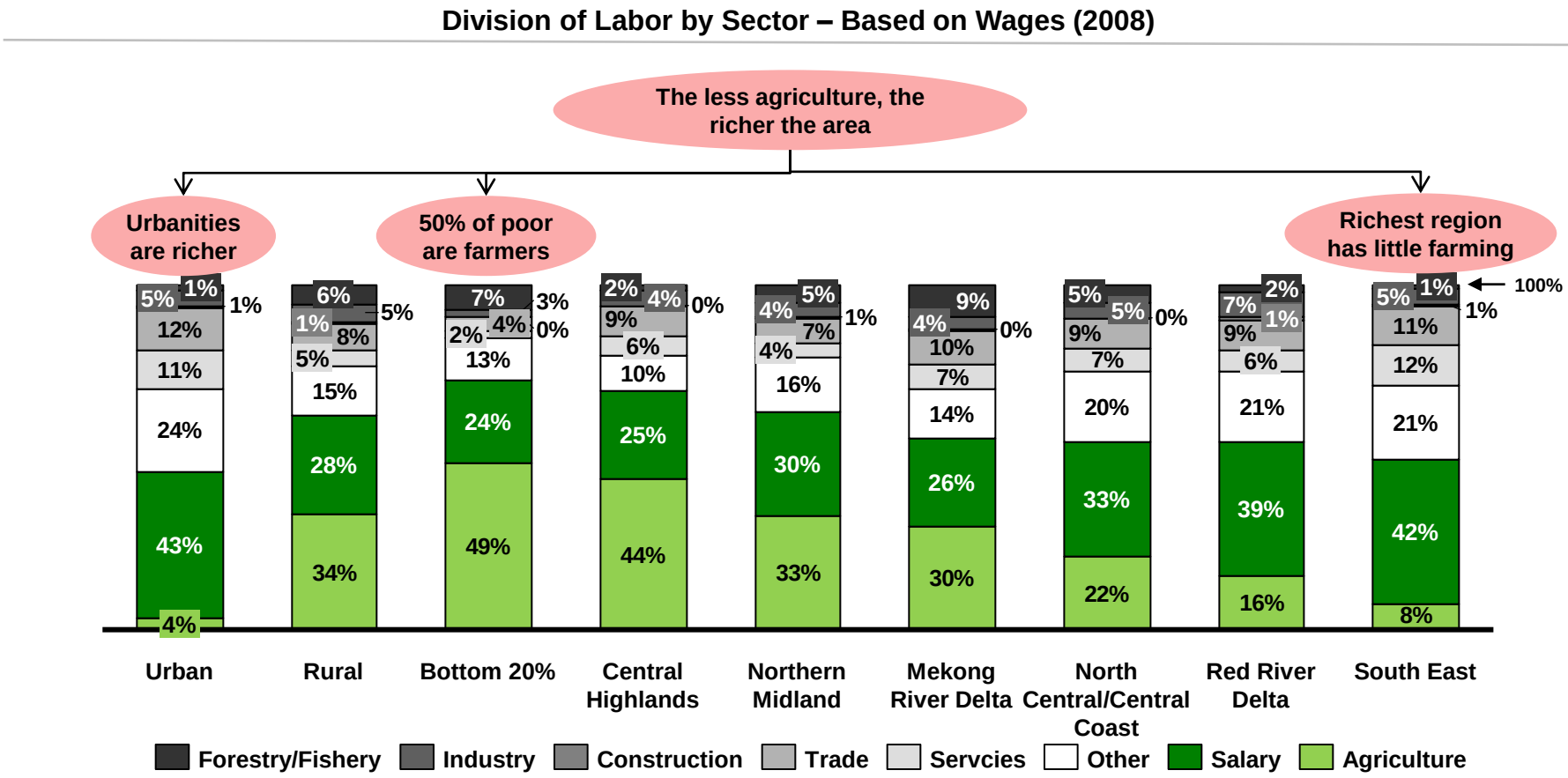
Cost savings from more efficient cookstoves is unlikely to be a strong motivator for the adoption of cookstoves

Source: GSO Living Standard Survey 2008

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

Livelihoods (2/2)

Most people who depend on solid fuels are farmers



- Implications -

Any cookstove programs must address the divergent needs of farmers across geographies

Source: GSO Living Standard Survey 2008

Indoor Air Pollution (IAP) in Vietnam

Just under half of the population, or 10.7m households, are exposed to IAP due to largely cooking indoors or in a separate building

Households Affected

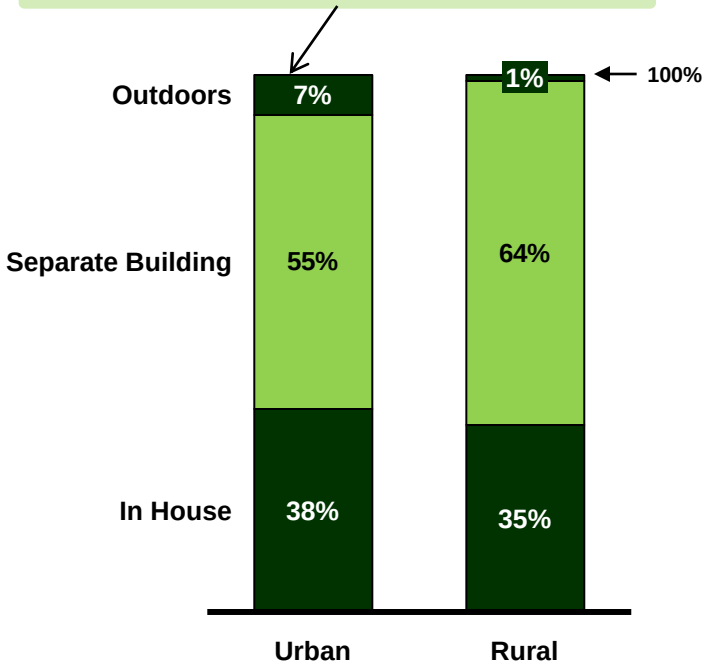
	Population (Households)	% Using Biomass	Total exposed to IAP (HH)
Rural (71% of total pop.)	16.2 million →	59% →	9.6 million
Urban (29% of total pop.)	6.6 million →	29% →	1.1 million
Those currently using ICS	30% →		- 3.2million
		Total →	7.5 million (33% of total population)

Health Impact

- 10,600 annual deaths attributable to solid fuel use in 2007, down from 23,800 in 2004
- A total number of 1,157,100 DALYs attributable to solid fuel use

Main Cooking Place

Increase in Urban outdoor cooking due to regulation against cooking inside



- Implications -

If indoor cooking can be reduced, it would have an impact on a third of the population that is currently impacted by IAP

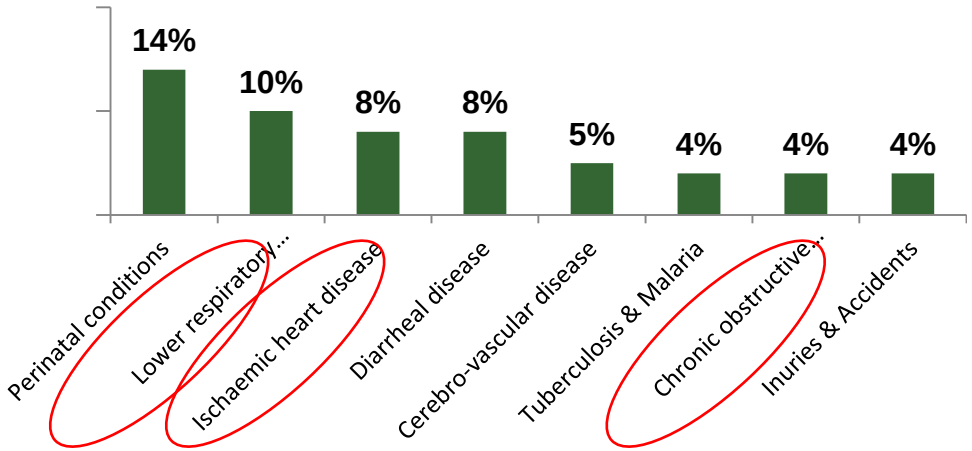
Source: GSO Multiple Indicator Cluster Survey 2011, WHO IAP: National Burden of Disease Estimates 2007, World Bank, WHO Factsheet 2004, GRET

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

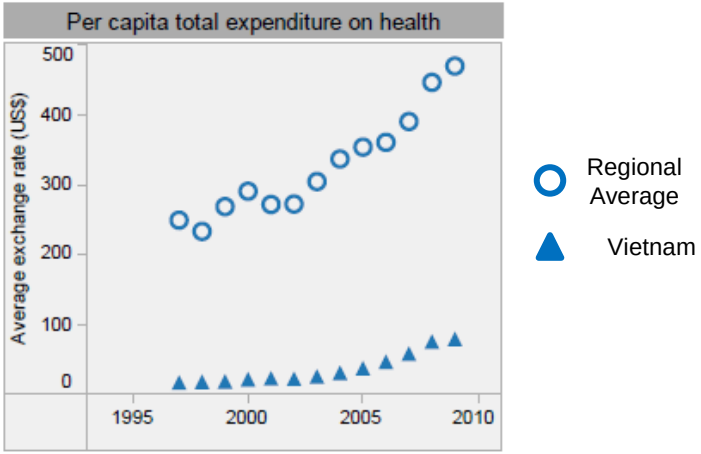
Indoor Air Pollution vs Other Priorities

Indoor air pollution is not prioritized in the face of other pressing health issues, such as water sanitation, persistent after effects of war, and outdoor air pollution

Burden of disease in Vietnam



Per Capita Health Spending



US recently approved $32 million of aid to help decontaminate areas affected by Agent Orange, starting around Da Nang. The toxin has seeped into nearby rivers and marshes. That raises serious concerns about the health of residents in the area.

Nguyen Thi Hien, who leads the Da Nang branch of the Vietnam Association of Victims of Agent Orange/Dioxin.

- Implications -

There is a need for greater awareness of the influential impact of air pollution on the health of the population

Sources:
Center for Disease Control and Prevention – Vietnam, WHO Vietnam Country Profile, http://www.asahi.com/english/TKY201108130263.html

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

Environment

Cleaner cookstoves and industrialized production of fuels and fertilizers can help to reduce emissions, deforestation, and improve crop yields and soil quality

Emissions & Forests

- 168,264 tones of firewood will be saved every year by the biogas program
- In 2008, the World Bank estimated 44.5% of Vietnam's CO2 emissions came from solid fuel consumption.
- One solar cooker can reduce CO2 emissions 1.095tons a year and protect 1,460 tons trees from being cut
- Though there is no current measure, it is widely accepted that GHG emissions are increased by open crop burning

Food Security & Biochar cookstoves

- Both at an industrial level and for household use, Biochar cookstoves and Gasifiers are being researched and produced with the aim of having a cleaner cookstove that also creates a superior organic fertilizer
- 1 month of meals from a PED Biochar cookstove can fertilize a 100sqm field
- Biochar can increase crop yields 20-300%, in combination with small amounts of compost
- Biochar reduces harmful emissions by trapping gases in the char ,which can then fertilize the soil and hold soil water better

- Implications -

Cookstove programs with a dual environmental benefit will be considered most interesting, and likely to be accepted by farmers, as long as the cookstove design is also consumer-friendly

Sources:
Interviews, Solar Serve, World Bank, SNV Biogas User Survey, Biomass Gasification and the Benefits of Biochar

Gender Issues in IAP

Women have considerable decision ability to reduce IAP in the household, but often sacrifice their own health and convenience in order to prioritize other needs of the family

Role of Gender in the Household

- Women are far more likely to be exposed to IAP in their role as primary cook
- Children are generally less exposed to IAP, as cooking tends to take place in a separate room, unless they are the 9% of children who are the cook for the household
- Women tend to be in control of household finances, but significant purchase decisions are made jointly with men

Challenges

- ICS lacks consumer appeal with both women and men, leading them to prioritize other purchases, such as satellite TV, over the purchase of a cleaner cookstove
- In their role managing household finances, women will make sacrifices in their own cooking convenience and health in order to save money by using cheaper fuels.
- In certain minority groups, a woman protects the house from ghosts by keeping a constantly running cookstove

Opportunities

- Women's Union offers microloans for women seeking to make household improvements (such as biogas installations) or start a business at 0.6%/mth
- The makers of GERES cookstoves in Cambodia are nearly exclusively women
- Women have historically been integral to any consumer awareness and health education campaigns, such as the Ministry of Health program promoting clean latrines and a Vinacapital promotion of hand washing

- Implications -

A successful cookstove be an attractive consumer product that will appeal to women as the steward of household finances and her role as family caregiver

Sources:
Interviews and field visits. Women's Union, Geres, MOH, SNV ICS Survey

Content

Assumptions

The customer segmentation in this section is an illustrative example of how the Vietnam market could be grouped. They are based on the following assumptions:

- The customer segmentation is designed to provide a high-level view of the market and strengthen the understanding of the customer base in Vietnam.
- The customer segmentation is based on a preliminary market assessment and has used a combination of both primary and secondary research. Further refinement of customer segmentation and customer profiles may be required for specific programmes and regions.
- The high-level customer segmentation calculations were derived based on the following mathematical assumptions:

    1. Animal Farmers do not exist in the cities and all animal farmers are above the poverty line, due to research indicating animal farmers are richer. Also, a minimum of 3 animals is required to create biogas. 1.3% of rural households are already using biogas. Half of remaining animal farmers already use modern fuel other than biogas.
    2. The poorest segments of urbanites use traditional fuels
    3. Animal farmers are all above the poverty line
    4. Animal farmers using modern fuel can still be converted to biogas

Consumer Landscape in Vietnam

To understand and derive insight on the consumer landscape in Vietnam the population can be segmented based on four key areas

Market
(Rural / Urban)

Household Fuel Type
(Modern/Traditional)

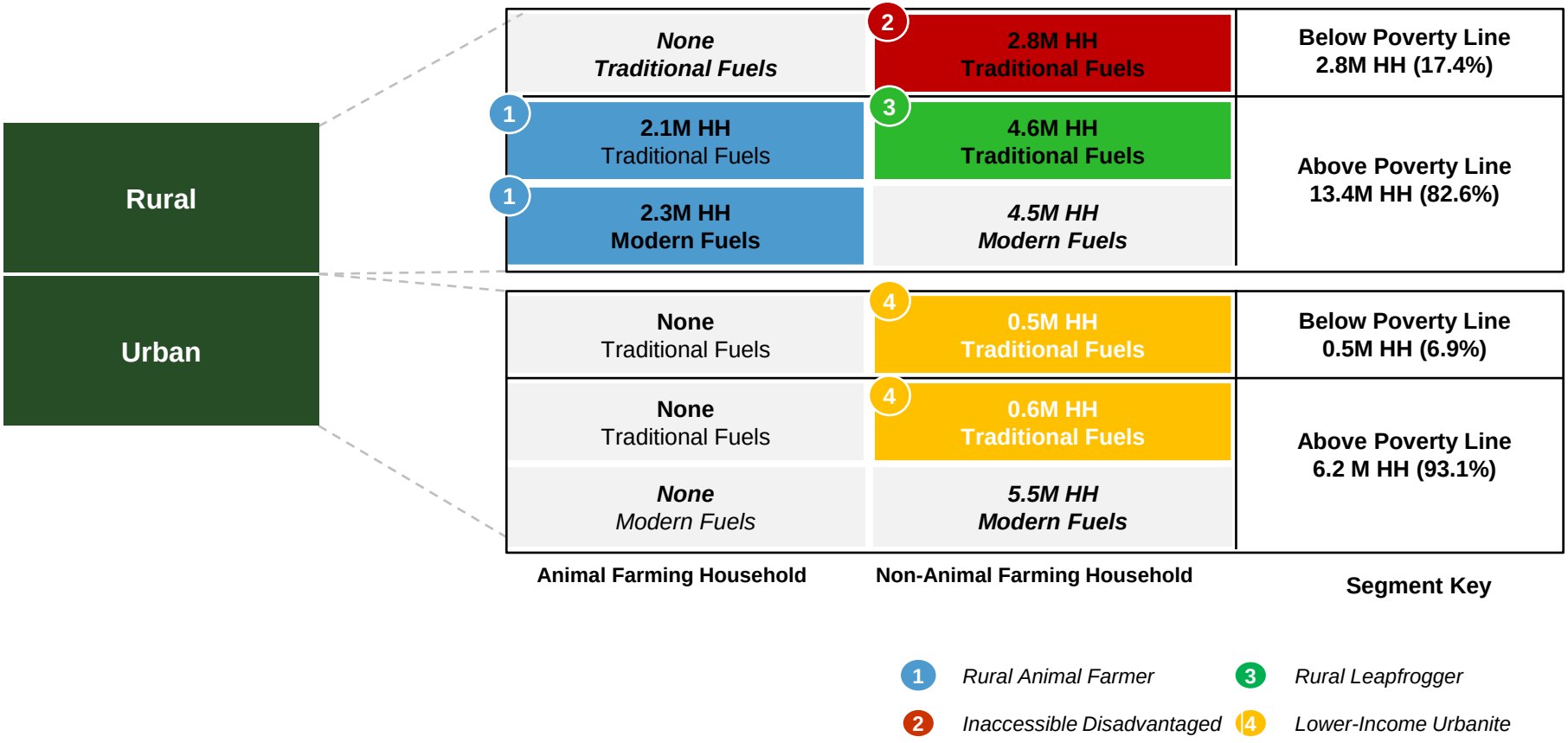
Income Level
(Below/Above Poverty Line)

Animal Households
(Households raising animals/not raising animals)

Note: The attributes of the segmentation are illustrative based on only initial research. Full

Target Market Identification

There are four very different markets with very divergent needs: Rural animal farmers, inaccessible poor, rural leapfroggers, and the lower-income urbanites.



- Implications -

The potential market for a cookstove intervention in Vietnam is approx. 12.8 million households

Sources: GSO, Vietnam Multi-Indicator Survey

Segment Profiles

The targeted population can be segmented into four groups: 1) Rural Animal Farmers & 2) Inaccessible Disadvantaged

Rural Animal Farmer
- Has access to modern fuels such as LPG and Electricity
- Has sufficient animals to justify bio digester investment

Inaccessible Disadvantaged
- Has limited or no access to modern fuels such as LPG and Electricity and is not near roads
- Primarily uses biomass (wood and agricultural residue)

Size in Households	• 4.4 m (19% of population)	• 2.8 M (12% of population)
Profession	• Animal Husbandry and Farming	• Subsidence Farmers, Gatherers, Ethnic
Household Income	• Above Poverty Line	• Below Poverty Line
Cooking Device & Fuel	• Traditional Wood burning cookstoves, Gas cookstove • Fuel: Firewood, LPG, Biogas	• Traditional: Fixed Cement cookstove, 3-stone fire • Fuel: Wood, crop residue
Cooking Location	• Indoors in a separate building	• Mostly Indoors for heat in winter, maybe go to a separate building or outdoors in winter
Cooking Frequency	• Two to three meals per day	• One to two meals per day
IAP Exposure	• Med	• High
IAP Awareness	• Med	• Low
Environment Impact	• High (Manure disposal)	• High (Deforestation)
Barriers to Switch	• Lack of Capital (81.2%) • Lack of enough Animals (23.7%) • Lack of construction area (21.2%) (Biogas User Survey 2011)	• Affordability • Access to financing • Awareness • Accessibility to modern fuels
Willingness to Pay	• Medium – hard to pay out of pocket	• Low, due to displacement costs from flooding
Purchase Drivers	• Fuel Savings • Ease of use • Perception	• Fuel costs • Ease of use

Segment Profiles

The targeted population can be segmented into four groups: 3) Rural Leapfroggers above the poverty line & 4) Lower-Income Urbanites

Rural Leapfrogger

- Has access to modern fuels but might not spend money on them in favor of portraying wealth through purchase of high cost electronics, etc

Lower-Income Urbanite

- Has access to modern fuels such as LPG and Electricity
- Increasing costs has forced a higher usage of coal
- Uses LPG for quick foods and electricity for rice cooker

Size in Households	• 4.6 M (21% of population)	• 1.1 M (5% of population)
Profession	• Farmers, Industry, Service & Salary Workers	• Service workers, industrial workers
Household Income	• Above the Poverty Line	• Below or near poverty line
Cooking Device & Fuel	• Traditional fixed cookstove and Portable cookstove • Fuel: Wood, Crop Residue,	• Traditional Rocket cookstove • Fuel: Beehive Coal
Cooking Location	• Outdoors during summer • Indoors during monsoon season	• Outdoors during warm season • Indoors during winter, though not 'allowed'
Cooking Frequency	• One to two meals per day	• Two to three meals per day
IAP Exposure	• High	• Med
IAP Awareness	• Low	• High
Environment Impact	• High	• Med
Barriers to Switch	• Affordability • Access to financing • Awareness	• Affordability – All would prefer LPG if they could afford it
Willingness to Pay	• Low – med, some can afford ICS while others will require financing or heavy subsidies	• Med – can pay if fuel price decreases
Purchase Drivers	• Ease of use • Perception	• Fuel Costs • Ease of use

Customer Segmentation Summary

All segments can be targeted, but programs will need to address radically different needs across the segments, from fuel cost to image, from simple, low-cost solutions to sophisticated systems

Customer Segment Characteristics

Segment	Size	IAP Exposure	IAP Awareness	Affordability	Willingness to Pay	Alternative Use	Distribution Access
1) Rural Animal Farmer	●	◕	◔	●	◕	◑	◑
2) Inaccessible Disadvantaged	◕	●	○	○	○	◑	◔
3) Rural Leapfrogger	●	◑	◑	◕	◕	◔	◑
4) Lower-income urbanite	◔	◑	●	◑	◔	◔	●

Key ○ **Minimal** ◔ **Low** ◑ **Medium** ◕ **Medium-High** ● **High**

Biggest difficulty is in profitably reaching the segment and getting them to understand the value of purchasing the cookstoves

Biggest barrier is willingness to pay for more expensive clean fuel

Rural Leapfroggers need to prioritize the purchase over other nice-to-have items

High affordability and alternative uses for heating and wine making are attractive for animal farmers

- Implications -

A cookstove solution should be tailored to the needs of each segment on variables such as size, IAP exposure, safety risks, price and consumer messaging

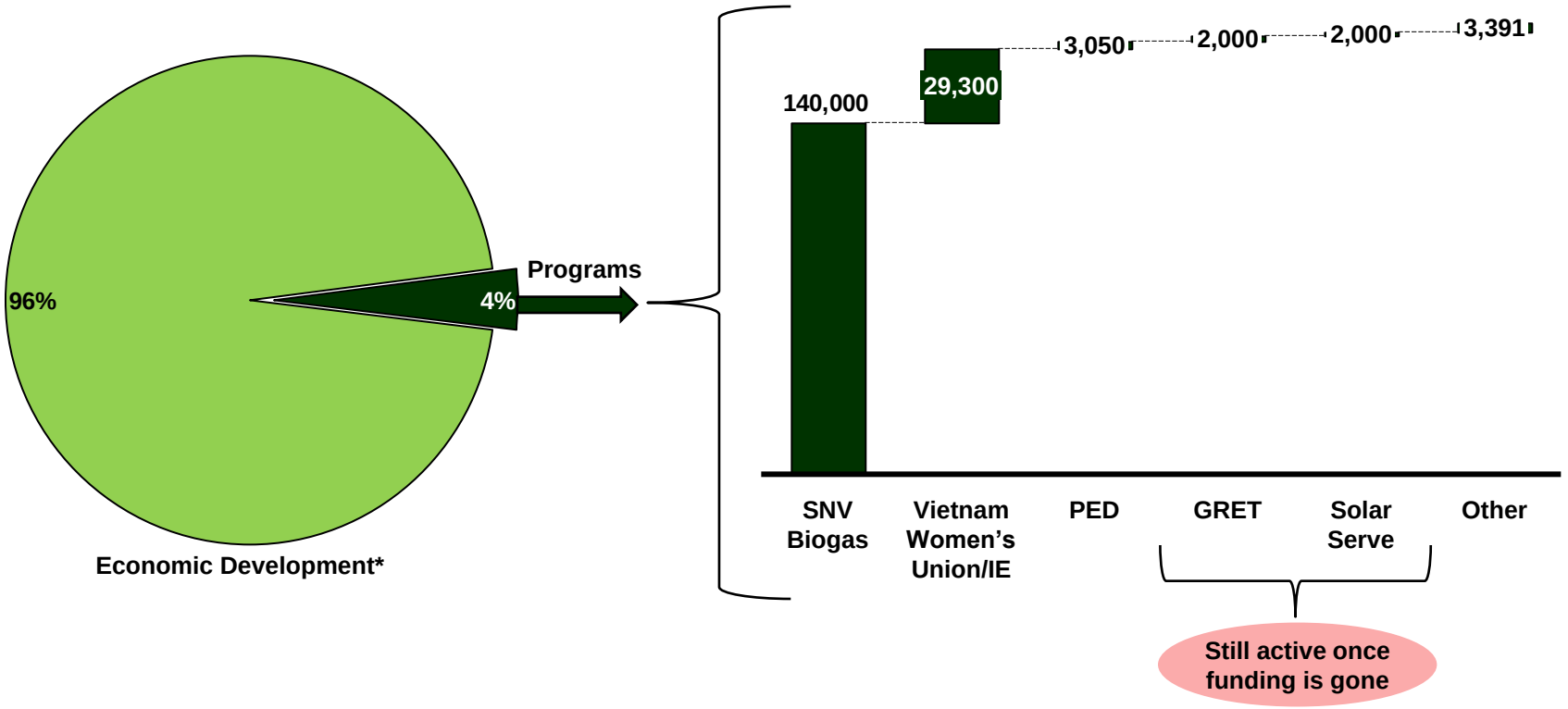
Content

History of Cookstoves in Vietnam

Since 1980, Migration to clean cooking has happened naturally as a result of economic growth and purposefully through dissemination by two major players: SNV and Vietnam Women's Union

Economic Development is the top driver of natural migration to cleaner cooking

Funded programs are mostly small, with SNV and Women's Union the largest



Other includes Caritas, FSTAC, Australian Foundation for the People of Asia and the Pacific, Forest Science Institute, Tay Bac University. cookstove program distribution is non-exhaustive and represents those discovered in the assessment. Economic Development refers to the reduction in population using Solid Fuels from 70% in 2007 (WHO) to 46.4% in 2010 (GSO). Sources from: Interviews with organizations. Action for the City Report on Fuel Efficient cookstoves, Air Quality & Health, SNV Biogas User Survey

Government Policy relating to Cookstoves

Government Policy relating to cookstoves largely centers around energy, a main topic of concern for the Vietnamese government as a means to combat the looming energy deficit

Government Policies

- Policies on Energy
  - Renewable energy action plan (REAP, 2001)
  - Electricity Law 2004 (develop clean energy and biomass)
  - Strategy for renewable energy development in Vietnam for 2030 with outlook to 2050 (drafted)
  - Master plan for renewable energy development for Vietnam 2011-2020 with outlook to 2030
  - 2012 Law of Energy Conservation and Efficiency – all sectors must implement energy efficiency
- 2005 Environmental protection law: Organizations or individuals who invest in development, use of clean energy, renewable energy, production of environmental friendly products get support from the state on tax, investment capital and land for project construction
- 2009 Decree on incentives, support on environmental protection activities: Subsidies and tax exemptions for environmental protection businesses and activities
- National program for biofuel development
  - Biofuels partially replace conventional fuels to attend energy safety and environmental protection
- Hanoi City policy against indoor coal cookstove cooking
  - Due to toxic SO fumes emitted
- Gender Policy
  - Law on Gender Equality, 2006 is an effort to close the gender wage gap.
  - In 2007, the Law on Domestic Violence Prevention and Control was passed

This list was compiled from a presentation at the ADB Inception Workshop in March, 2012 as a list of policies most relevant to bioenergy and biofuel production in Vietnam. Additional policies were mentioned in interviews and from the NL Agency Biomass Business Opportunities Viet Nam. It is by no means exhaustive

Standards & Testing

Though there is a strong recognized need for standards, Vietnam does not currently have regulated IAP standards and testing facilities have been dismantled due to lack of use

No Functioning cookstove Testing Labs

- There are several labs within Hanoi that have capability to analyze air pollution, but most do not have a full capability to analyze all pollutants and results have been inconsistent
- **Institute of Energy** used to have a lab that was used for cookstove testing, but it is currently not in operation

"If we invest in a new and better design of cookstove, it will take our competitors a month at most to copy and then sell at lower price. We need protection of our intellectual property but it is very weak in Vietnam." (cookstove producer Bac Ninh)

Fuel Efficient cookstoves, Air Quality & Health

A study in HCMC showed that the majority of rich and poor think air quality is important to extremely important, and only 3% of the poorest households thought air quality was not important.

No Indoor Air Pollution Standards

- There are no specific standards available for indoor or household air pollution.
- **NIOEH** has conducted research on IAP and is working to create an IAP standard for offices, schools and factories in urban and rural areas
- The 2005 Law on Environmental Protection stipulates that local governments must limit construction dust emissions
- Standards on Air Quality:
  - TCVN 5937-2005 – Ambient air quality standard
  - TCVN 5938-2005 – Thresholds of some toxic substances in ambient air
  - TCVN 5939-2005 – Industry emission standards for dust and inorganic substances
  - TCVN 5940 – 2005 – Industry emission standards for selected organic substances

Source: Fuel Efficient cookstoves, Air Quality & Health, http://www.mcnv.nl/uploads/media/Fuel_Efficient_Stoves.pdf, Interviews

Illustrations of Current Technology Landscape

Around 1/3 of the country still uses a traditional cookstove, and all cookstoves in Vietnam are notably lacking in branding

Traditional Fixed

- Used by population affected by IAP (around 33%)
- Does not burn efficiently and uses 10-63% more wood
- Can be heavy and go through floor of houses
- Materials always available and simple to construct
- Any biomass fuel can be used

- Use ◑
- Availability ◑

Beehive Coal cookstove

- In combination with Traditional Fixed, used by population affected by IAP (around 33%)
- Mostly used in the urban areas
- Most made in north by SME workshops, max 2000-3000/mth production capacity
- Commonly sold in any urban market and cheaper than other cookstoves and fuels

- Use ◑
- Availability ●

Tea Drying cookstove

- Typically in an outdoor, covered area and with a simple open grate to hold the wood for tea drying
- Does not burn efficiently – essentially an open fire
- Only used during tea harvest
- Any biomass fuel can be used

- Use ◔
- Availability ◕

Key ○ **Minimal** ◔ **Low** ◑ **Medium** ◕ **Medium-High** ● **High**

Sources: Forest Science Institute, site visit to Thai Nguyen, Action for the City

Illustrations of Current Technology Landscape

Cookstove Industry

Alternative and renewable energy cookstoves are getting a foothold in a Vietnam that is looking toward a looming energy deficit. However, penetration of such cookstoves is low.

Biogas

- Successful in distributing to animal farmers, between 140k and 1m in the past 20 years
- Easy to use for multiple purpose, like pig food and making wine
- Initial high investment ($400-750) but loan options are available
- Unused Biogas released into the air is actually worse

- Use ◑
- Availability ◑

Solar

- Only 2000 cookstoves distributed so far
- Limitations due to inability to use without sun in rainy season or in the north, where sun exposure is half of the south
- Only can be distributed and bought online, with no set-up assistance
- Less intuitive to use

- Use ◔
- Availability ◔

Gasifier

- Very efficient at boiling water in just over 3min, also produces Biochar for crop fertilizer
- Not yet developed to be customer friendly. Requires electricity, cant last through a meal, difficult to light and change fuel, dangerously hot, difficult to light
- Not sold yet

- Use ○
- Availability ○

Key ○ **Minimal** ◔ **Low** ◑ **Medium** ◕ **Medium-High** ● **High**

Sources: Site visits, Gasifier & Biomass research, Solar Serve, SNV

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

Illustrations of Current Technology Landscape

LPG is an aspirational cookstove, more so than any ICS, and people will keep moving to it to the extent they can afford to do so

LPG Gas cookstove

- Over 50% of the population has an LPG cookstove and 61% of traditional cookstove users plan to get one
- High efficiency and zero emissions associated
- Affordable for most at $50-100
- Use driven by LPG price and convenience of LPG. Someone delivers it.

- Use ◑
- Availability ◑

Biochar

- Uncommon and still largely in research, design and testing phases, with small scale distribution
- Heavily subsidized below cost at $7 (vs. $15 cost)
- Inconvenient to load and light, but can provide fertilizer (enough for 100sqm/mth/HH)

- Use ◔
- Availability ◔

Improved Portable

- Different models available all at reasonable cost through a variety of programs and silent distribution
- Cost is reasonable and easy to adopt if traditional cookstove s are already in use
- Efficiency not immediately apparent, so willingness to pay is not higher, despite increased efficiency

- Use ◑
- Availability ◕

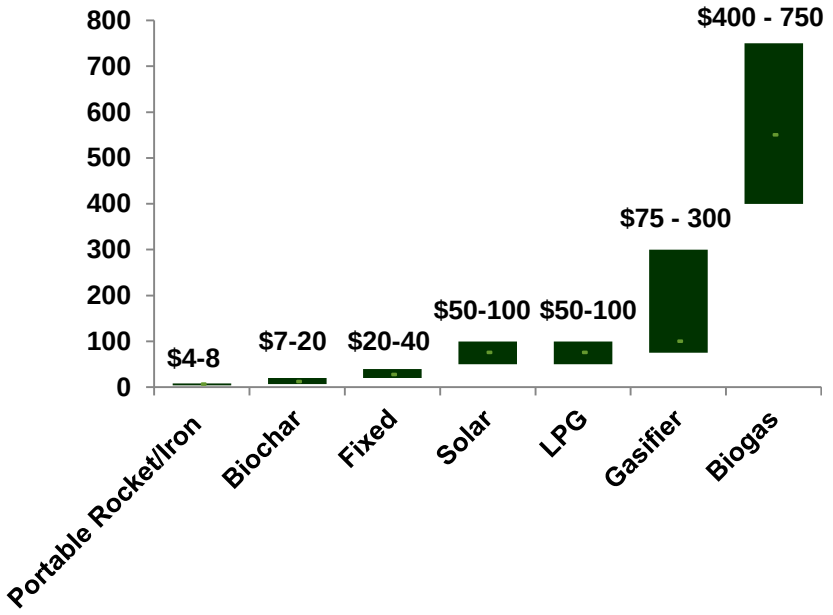
Key ○ **Minimal** ◔ **Low** ◑ **Medium** ◕ **Medium-High** ● **High**

Sources: PED, Interviews, Action for the City

Available Cookstove Cost

Biomass cookstoves are cheapest, though largely indistinguishable in the market place, with all but the Gasifiers below $40. A household Biogas system represents a significant investment at a min $400

Upfront Cost by Product



All prices are in USD equivalent

Observations

- Portable ICS and Traditional cookstoves are generally indistinguishable in the market place, and therefore sell for similar price
- Biochar is currently being sold through the PED program at a subsidy below cost of production at $7. Actual cookstove price should be $20
- Fixed cookstoves have doubled in price since 2002
- Solar cookstoves come in two models, (parabolic and solar box) one the half price of the other
- Biogas systems are dependant on the size of the system, but have doubled across the board in the last decade from $200 to at least $400. 16% of households got a loan for 36% of the cost
- A disposable biogas system for $200 exists, but lasts only 2 years

- Implications -

There appears to be little 'wholesale' price variation amongst biomass cookstoves but effort needs to be made to distinguish them from traditional cookstoves and increase consumers' willingness to pay

Source: Primary research and Interviews, Action for the City Report, SNV Biogas User Survey

Overview of Current Cookstove Initiatives in Vietnam

With the support of government, NGOs have dominated the implementation of cookstove initiatives, with small scale, fragmented efforts in the private sector and key innovations coming from academia

Private Sector

Engineering, Separation and Recycling LLC (Paul Olivier)

Indochina

TXT

Unknown # of Entrepreneurs and hand shops

Government

VIỆN NĂNG LƯỢNG
INSTITUTE OF ENERGY

Ministry of Agriculture and Rural Development

NGOs

PED – Trung tâm Dân số - Môi trường - Phát triển

care

GRET – Professionnels du développement solidaire

SNV – Connecting People's Capacities

UNDP

Nordic Assistance to Vietnam

geres Cambodia

CRD

nexus – Carbon For Development

Academia

TRƯỜNG ĐẠI HỌC TÂY BẮC
Tay Bac University

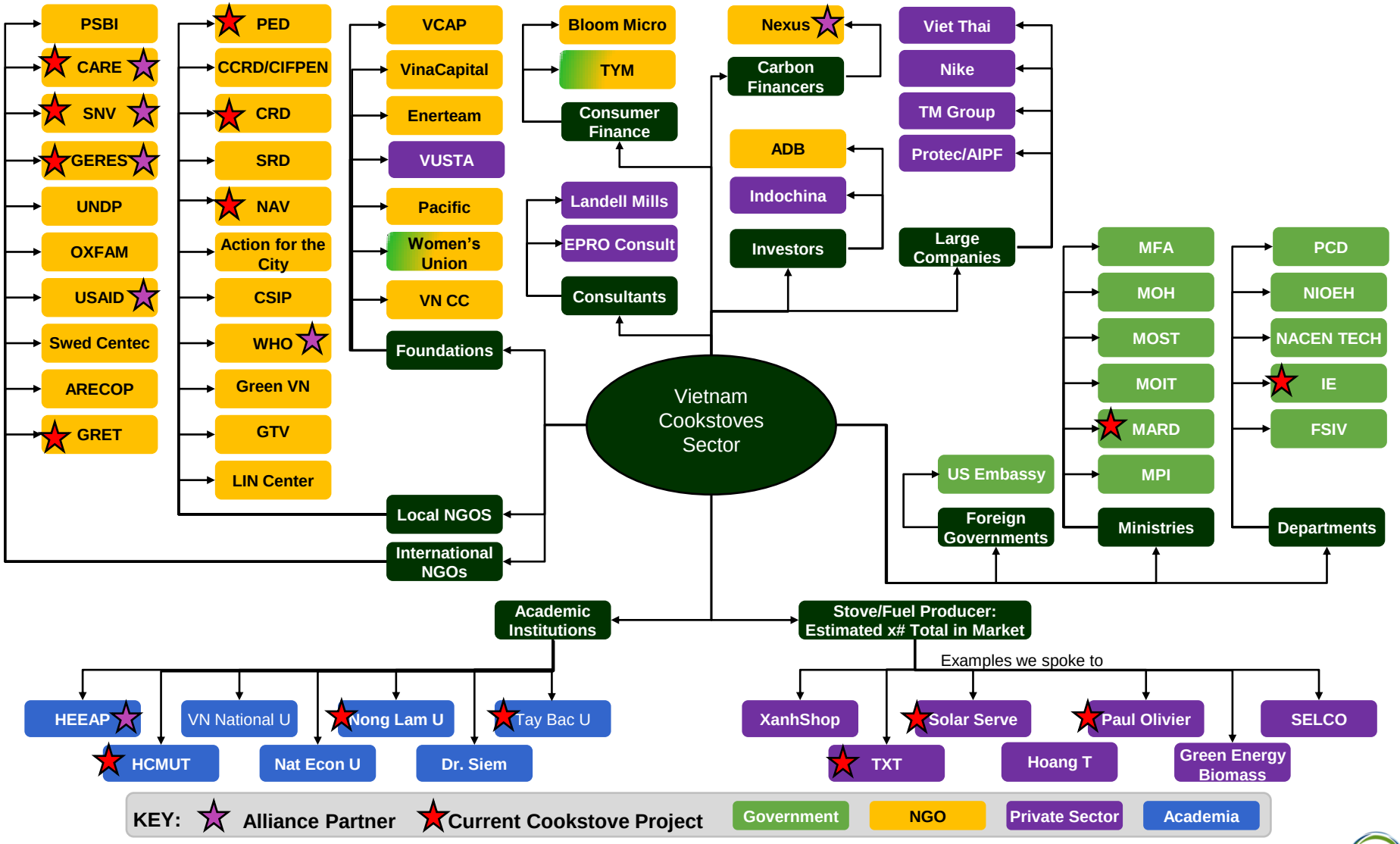
TRƯỜNG ĐẠI HỌC NÔNG LÂM TP. HỒ CHÍ MINH
Nong Lam University

BK TP.HCM – HOCHIMINH CITY UNIVERSITY OF TECHNOLOGY

- Implications -

The biggest opportunity is to connect the academic innovations, learning from NGOs, and use it them consolidate and support the development of private sector initiatives

Vietnam Stakeholder Map



Note: This is not a comprehensive list of organizations working in cookstoves. It is designed to be a working document that expands over time

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

Major Cookstove Initiatives in Vietnam – Past Programs

There have been many small and large ICS programs promoted in Vietnam in the past, below are a selection of impactful and/or unique projects

	Vietnam Women's Union	Forest Science Institute Vietnam	Tay Bac University	Action for the City
Who	Social-Developmental organization with 13 million members in Vietnam, mandated to protect women's legitimate rights and strive for gender equality	Institute organizing and implementing scientific and technological research on silviculture, forest industry, forest economics, forestry organization and management	University in northwest Vietnam, department working in forestry and agriculture	Vietnamese NGO based in Hanoi since 2006 focusing on improving city living in terms of Environment, Social Development, and Creative Urban Living
What	The WU employed an ICS dissemination strategy that concentrated on training local residents as cookstove builders. In all, the WU programme has distributed 29,300 cookstoves (25,000 in Ninh Binh province alone, the WU achieved nearly 20% coverage via subsidies)	Innovated a lighter iron/steel cookstove for $10 and distributed 300 cookstoves for free in Su La province in 2010 Have trouble in commercializing from lab to marketplace 30-50% reduction in wood 30-35% reduction in cook time 70-90% reduction in pollution	Got Micro-grant to introduce 75 cookstoves for one Thai Minority Village in Ban Nhop. In 2010. Conducted user testing for 4 cookstoves and education of benefits Now we have plan for scaling up our project for 10000 householders in NW Vietnam	Conducted a study on urban fuel efficiency, air quality and health that has given insights into urban IAP and consumer behavior.
Challenges	High cost, limited geographical reach and inconsistent quality. No follow-up or technical quality checking was conducted. When the subsidies ran out the dissemination of cookstoves also stopped	Creating a market is difficult, as well as maintaining the copyright design and procuring funding for researchers. Farmers don't want to repair	Must speak local language. Difficult to convince villagers. Efficiency of cookstoves tested through users only. Sample size too small to extrapolate results	Study is now aging. NGO is small and does not have country-wide influence
Partners	The main implementation arm of nearly all significant ICS projects in Vietnam, including PED, FSIV	Women's Union, Center for reproductive and family health, Hanoi Architecture University, ARECOP, FAO, Swedish International Development (SIDA), MOST	George Washington University Funded Project	Pauline Oosterhoff, PhD, MPH, MA MCNV

Sources:
Interviews, NGO Documents

Major Cookstove Initiatives in Vietnam – NGOs – Active Programs

NGOs are mostly operating ICS programs as a component of their larger portfolio of aid. Below are active programs with a continuing benefit

	SNV Biogas Program	Population, Environment and Development Center (PED)	Nordic Assistance to Vietnam	GRET/CRD/TXT
Who	Dutch based NGO. Founding partner of the Alliance and active across much of South Asia	PED is a local NGO – a scientific technological and non-profit organization mission is to contribute to sustainable development of the country, especially needy regions	NGO giving social and humanitarian assistance to Vietnam	GRET is an NGO of professionals for fair development active in 30 countries in 16 fields. It supports sustainable development processes in urban and rural areas
What	Biogas Programme for the Animal Husbandry sector of Vietnam 2003 - Disseminates Biogas Digesters to animal farmers in 46 provinces. Has had good success with 140,000 systems targeted by 2012, and has won awards for its success	2006-2010: Marketing of Improved Cook cookstoves (ICS) in Thanh Hoa (2006-2008) and in Thai Nguyen province of Vietnam (2007-2010) focusing on fixed cookstoves. Currently focusing on Biochar portable cookstove (40 cookstoves)	2011 – as part of the Climate Mitigation Project, worked to construct domestic biogas plants and distributed 87 cookstoves with a $30 subsidy. Has locals collect crop residue to turn into rice briquettes	ICS as small component of the Green Future Project in 2009, where it distributed 2000 cookstoves of three different types for almost no profit. It is sufficiently market based that it continues unaided today, (300/mth) driven by the local companies/ NGO
Challenges	Is looking to move into the ICS space and has already conducted a user survey in northern Vietnam. Is hoping to save 60% in cookstove efficiency, but needs a solid funder.	Durability of cookstoves and rate of continued adoption is unknown as provinces get richer. Continued action of entrepreneur cookstove makers after funding ends is unknown	cookstoves are of unknown efficiency. The rice briquettes have durability issues in wet weather and it is difficult to establish willingness to pay amongst the population	The design has been plagiarized and is being sold in nearby provinces. The factory is still by hand, limiting potential scale. Distribution to other provinces difficult/expensive
Partners	Ministry of Agriculture & Rural Development, Department of Livestock Husbandry, ADB funded QSEAP program	Vietnam Union of Scientific and Technical Associations (VUSTA). Funded by: ETC/EASE and now CARE	Norwegian Church Aid funds the NGO	CRD, TXT – Local Vietnamese NGOs/Businesses implementing the project

Sources:
Interviews, Action for the City Report, NGO Documents

Major Cookstove Initiatives in Vietnam – Private Sector & Academics – Active Programs

Private sector and academic activity is largely centered around innovations in cookstove design and renewable energy

	Solar Serve	Engineering, Separation and Recycling LLC (Paul Olivier)	HCMC Technology University	Nong Lam University
Who	A social enterprise focusing on poor communities and the people who live in seriously areas, to help reduce the rate of the deforestation for cooking and IAP	Paul Olivier is working out of Da Lat, focusing on the pure design of gasification and consumer gasifier cookstoves	University funded programs in technology and energy	Nong Lam University focuses on education and research for agriculture and rural development
What	After more than 10 years of Solar Serve provided more than 1500 solar cookers for the poor people living in deforestation areas and sold more than 500 solar cookers to the organizations and private clients	The cookstove design was taken from the Pilipino Benlonio cookstove – a top-down burning cookstove safer than other models. The cookstove can bring 7kw of heat, water to a boil in 3 min and 25 seconds. It has not been distributed widely, as it is not very consumer friendly and is rather expensive	Conducting Biomass Research on turning crop residue into electricity for a town and Biochar by product to be used as fertilizer. Has a pilot town called One Town 40km from HCMC. Can create 500kw/hr. Looking to build a rice pellet factory making 500kg/hr	Nong Lam University is conducting research on several projects, including disposable bio digesters for biogas and gasifiers originally designed by Paul Olivier
Challenges	Distribution and marketing is challenging and a focus moving forward, as is affordability as the cookstoves cost $50-100. They also cannot work in the North due to lack of sun.	The outside of the container can get to 500c. It has to be emptied every 40 min. The filling and empting process must take place outside due to dust. Difficult to light. Electricity required to run fan	Transitioning from pilot to implementation has not yet been settled or considered	Marketing of the bio digester. UV resistant plastic would make it last longer. Gasifier is being continuously improved, but has not yet undergone user acceptance testing. Hypothesis is that it is inconvenient
Partners	CSIP support	Xanhshop for potential distribution, Dalat University, Nong Lam University	HEEAP, Bepgasinhhoc.com	Paul Olivier, Livestock Research for Rural Development (LRRD.org)

Sources:
Interviews, Solar Serve Report

Major Cookstove Initiatives in Vietnam – Government – Active Programs

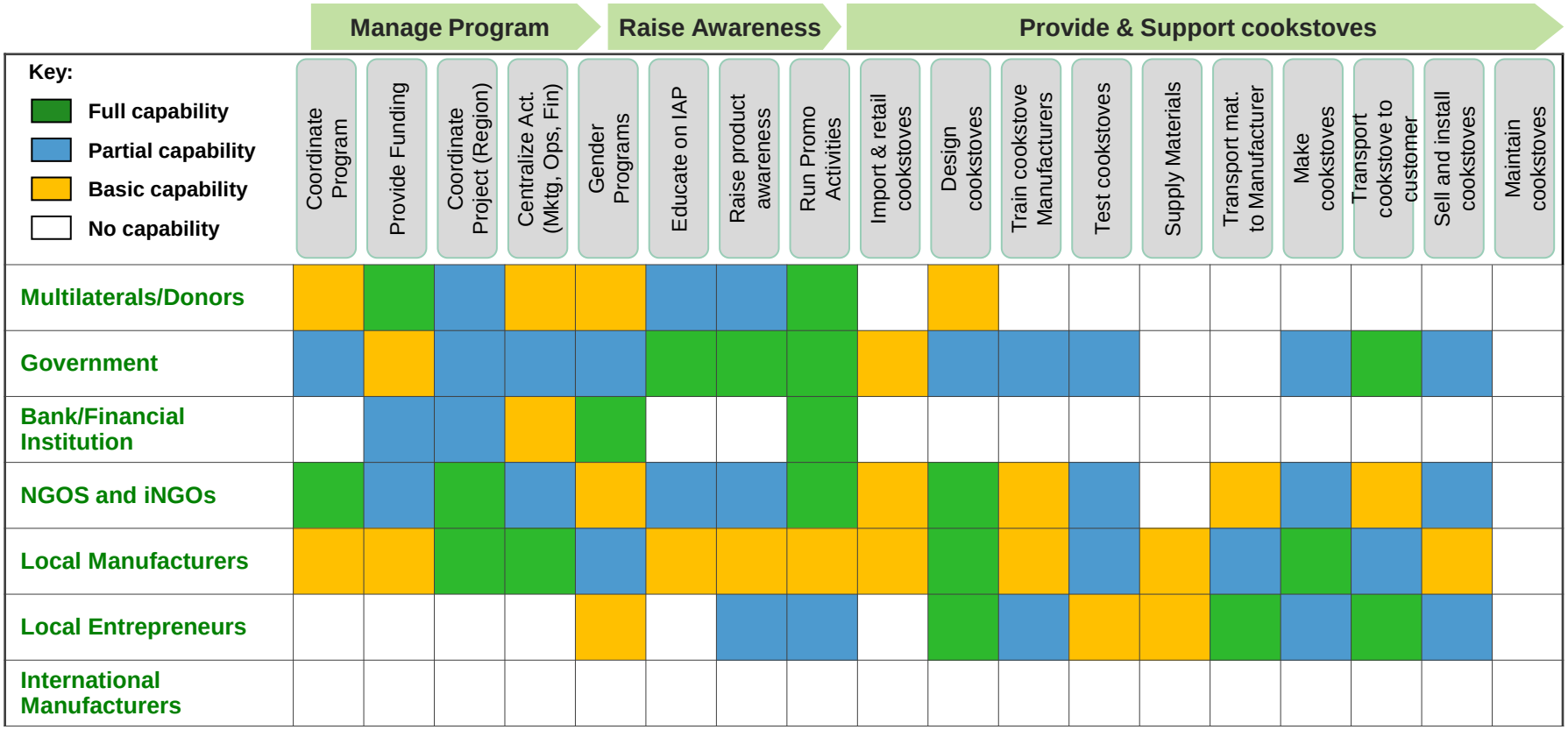
Government programs are largely externally funded, but there are some key activities in microfinance, research, and program implementation

	Institute of Energy	TYM	National Institute of Occupational and Environmental Health	
Who	Under the Ministry of Industry and Trade, IE focuses on technology development	Branch of the Women's Union – one of the only micro financing operators providing loans for women below the poverty line	Department within the Ministry of Health	
What	Conducts a) Biogas program and b) ICS programs since 1990, working with Women's Union. Mostly Fixed cookstoves. Recently – 1,500 cookstoves in Phu Thao, and trained masons. 2010 1000 more. cookstoves save 30-40% fuel. Has also been a historical testing center that is out of use	Loans up to 25m VND for the rate of 1.2%-0.6%/mth for general, housing, and multipurpose loans in 10 provinces in the north. Has 74,000 clients and has risen 60% of them outside of poverty after the loan. 99% payback ratio	Has conducted a study on IAP for offices, schools and factories. Has found that in general, urban IAP is higher than standard, but rural meets standard. Most IAP is caused by outdoor air pollution	
Challenges	The budget to conduct repairs is not provided. It is difficult to match the holes to the various pan sizes.	Plans to expand to the entire country. Loans unavailable for those above the poverty line	Study not yet published	
Partners	Women's Union	Women's Union		

Sources:
Interviews,

Cookstove Industry Value Chain

Vietnam has a strong program management and awareness capabilities, but needs to improve at the back end of the value chain that imports stoves/materials, sells, distributes, and maintains cookstoves



- Implications -

Programs need assistance moving into practical and sustainable market development

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Market Attractiveness

As part of the Vietnam Energy Efficiency Program, the Vietnam government has established the 2011-2015 goal of meeting 5 – 8 % savings of total energy consumption, compared with the base case of the 2006 forecast on energy development.

	Designated National Authority (DNA) & Programs of Activities (PoA)	cookstove & Program Accreditation	Carbon Baseline	Country Classification	Scale of Program	Monitoring & Evaluation
Best Case	Pre-existing DNA & related PoA	Pre-existing CDM-accredited cookstove program in country	Previous cookstove projects to leverage for baselining	Least Developed Country	Estimated income will significantly outweigh costs of registration & monitoring	Approved cookstove monitoring methodology in use in country
	Pre-existing DNA; No PoA	Pre-existing GS-accredited cookstove program in country	**Similar projects (e.g. Biomass) to use as proxy for baselining**	**Advanced developing country**	**Unclear business case for carbon financing activities**	Approved monitoring methodology in use in country
	Clear organizational candidate for role of DNA	**No accredited cookstoves or cookstove programs in country**	No previous projects to use as reference	Developed Country	Costs of registration & monitoring will likely outweigh income generated by carbon credits	Clear monitoring partnership opportunities and capabilities
Worst Case	No clear candidate or competing agencies					**Lack of monitoring capabilities or partnership opportunities**

- Implications -

The government has been supportive of energy savings initiatives, but most carbon programs to date have been focused on industrial CDM projects. Working with cookstoves and households will be a learning experience, especially in regards to monitoring.

Legend: **Vietnam**

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Carbon Finance Programs

Vietnam has 280 CDM projects, but only 18 are focused on biomass energy. While there are projects around biogas and biomass fuel, there are no current carbon financing programs on cookstoves.

	Farm Household Biogas Project in Can Tho City	Masan Biomass Boiler Project	Boiler Fuel Conversion from Fuel Oil to Briquettes Biomass Fuel at Saigon Ve Wong Co
Description	• The project will provide biogas digesters to farm households in rural areas of Can Tho City in the Mekong Delta. The project will reduce the amount of fuel wood and fossil fuel used for cooking and heating water.	• The project will utilize biomass residues as the primary biomass fuel for heat generation. Tin Thanh Industrial Electricity and Steam Company Limited will construct and install biomass-based boilers to replace the existing fuel oil fired boilers in Masan Industries.	• The project will reduce the GHG emissions by fuel conversion in fuel oil fired boilers for steam generation. The raw material used for producing briquettes is rice husk - a renewable by-products originated from various agricultural crop activities.
Participants	• Can Tho University • Japan International Research Center for Agricultural Sciences	• Tin Thanh Industrial Electricity and Steam Company Limited • Masan Industries Company • INTRACO	• Saigon Ve Wong Co., Ltd • TÜV NORD
Progress	• Entered pipeline in Dec 2010 • Currently in validation stage • Credits expected to start Jan 2013	• Entered pipeline in Dec 2010 • Currently in validation stage • Credits expected to start April 2011	• Registered on July 2011 • Validated by TÜV-Nord in May 2011 • Has already generated credits but buyer has not been identified

- Implications -

Carbon financing is gaining recognition in Vietnam, which is promising for cookstoves. Relevant projects involving biogas and biomass are in the process or have received CDM registration.

Source: unfccc

Vietnam Carbon Financing Organizations

Despite not having carbon financing projects related to cookstoves, Vietnam has experienced organizations that can implement carbon projects.

- Nexus' mission is to scale up and replicate its members' successful projects by facilitating their access to appropriate financing such as carbon finance.
- They incubate and develop grassroots organizations until they become "investment ready."
- Nexus was instrumental in securing carbon financing for GERES, an NGO which distributed 2M cookstoves in Cambodia.
- Nexus is working with SNV to design a carbon financing scheme for its 115,000 biodigesters in Vietnam.

- INTRACO has one of the largest and most diversified portfolios of emission reduction projects in Vietnam.
- Projects are located in all over the country, and vary by both project type and size. They range from CDM renewable energy, biogas. biomass to oil & gas fields.
- Projects include:
  - Lap Vo rice husk biomass power plant project converts rice husk to electricity
  - Sai Gon Beer Biomass Project replaces use of fossil fuels with use of rice husks.

- REEEP's Voluntary Carbon Offsetting scheme is a mechanism by which governments (both local, regional and national), companies and other institutions can outsource the purchase of CDM or Gold Standard Verified Emissions Reductions (VERs) to REEEP as part of a carbon reduction strategy.
- In the field of Renewable Energy, REEEP looks for photovoltaic, solar thermal, wind, biofuel, hydro and geothermal projects, and in Energy Efficiency, looks to support projects which improve energy efficiency in the domestic, public, agricultural and industrial sectors.

Source: Interviews and company websites

Carbon Market Buyers

Vietnam is limited in the EU market after 2012 due to not being a "least developed country." However, it can achieve success in voluntary markets, especially since cookstove carbon credits are very attractive due to their social benefits.

Buyers of Credits	Current Situation	Issues	Demand Trend
European Union Emissions Trading Scheme	• The EU is the main market for carbon credits developed in Vietnam through CDM	• The EU has indicated that it will favor the group of least developed countries (LDCs) • Vietnam is not considered a LDC, hence it will be ineligible to register for credits after 2012	↓ **Decreasing**
Other International Buyers (Voluntary)	• No cookstove carbon credits exist in Vietnam yet • Vietnam is attractive because of its marketable benefit of being perceived as a stable country	• Potential cookstove carbon credit developers are optimistic about the prospects of this market since cookstove carbon credits are very attractive to buyers around the world due to their social and poverty reduction benefits	↑ **Increasing Potential**
Vietnam Buyers (Voluntary)	• There is virtually no domestic carbon market in Vietnam	• Two international companies, with local Vietnamese operations, have expressed some interest in buying locally generated VERs, but there is nothing tangible	↑ **Increasing Potential**

-Implications –

The prospects of cookstove carbon credits are positive, particularly if the voluntary markets become more developed.

Source: Interviews and Practical Action report

Carbon Financing Stakeholders

The National Government is supportive of carbon financing, but the infancy of the Voluntary Carbon Market and cookstoves sector are large barriers.

- Key Stakeholders -

National Government

- Over the past decade, the Government has implemented the necessary laws, policies and administrative infrastructure to enable Vietnamese entities to participate in the CDM. It has also introduced investment incentives for CDM projects
- In 2009, The Institute of Energy co-hosted a workshop "Making Carbon Markets Work for the Poor in Vietnam," demonstrating their commitment to find solutions to current barriers
- Team recognized opportunities to generate VERs through poverty reduction projects like improved cookstoves

Developers

- There are over 280 CDM projects in Vietnam, the vast majority being hydropower industrial projects
- The Voluntary Carbon Market remains undeveloped in Vietnam and awareness was found to be very limited
- Some organizations indicated intention to participate in voluntary market in the future: Vietnam Forestry Technology Association, SNV, Hanoi Urban Environment Company Ltd, RCEE Energy and Environment Join Stock Company

Local Communities

- Communities lack awareness and understanding of carbon financing and how they can benefit from it
- Most cookstove projects are small-scale and do not justify the costs of implementing carbon financing
- Monitoring will be a challenge, as most of the country's prior experience has been with industrial companies, not households

-Implications –

Cookstoves will benefit most from a developed Voluntary Market in the future. In the meantime, local communities must support large-scale cookstove programs to justify registration efforts.

Source: Interviews and Practical Action Report

Overall Carbon Finance Feasibility

Vietnam represents a major opportunity for carbon financing, but it is too early for cookstoves since there are no viable large-scale projects.

- Supportive Market Criteria -	- Potential Risks-
Existing Designation National Authority: Ministry of National Resources and Environment	The carbon market is still very new within local and national government
Vietnam is considered an underexploited resource, an attractive alternative to China, India and Brazil	Lack of focal point or national center for VCM information in Vietnamese. Mistranslation of technical language causes delays.
Vietnam is seen as a politically stable country	Limited and often unsuccessful experience with CDM and no experience with VCM procedures such as validation, registration or verification.
Due to cultural similarities, there is potential to replicate projects in Vietnam that have been successful in China	Unavailability of an official data source for baseline data, which is a large barrier for registration

Opportunities

- The Voluntary Carbon Market (VCM) is most relevant for cookstoves, since no additional CDM registrations will be accepted after 2012 from non-LDC countries.
- The VCM needs time to mature and stakeholders need to become more familiar with the registration and monitoring process.
- Carbon financing in Vietnam would be highly beneficial to increase distribution and to fund repairs and replacement of cookstoves, if there were a large enough project to justify registration efforts.

Source: Interviews and Practical Action Report

Microfinance Sector Vietnam

The below is an inconclusive, non-exhaustive description of the micro-financing sector in Vietnam, sourced from the ILO office in Vietnam. The sector is divided into degrees of formality

Formal	Semi-Formal	Informal
• Vietnam Bank for Social Policies • Vietnam Bank for Agriculture and Rural Development • Vietnam Postal saving Company	• 57 International NGOs • 4 government-recognized micro-finance organizations	• "Ho/Hui" (a popular form of rotating savings and credit associations (ROSCA)) • Relatives, friends, neighbors • Moneylenders

Summary

- The key players in the formal micro-finance market are the two state-owned banks: Viet Nam Bank for Social Policies (VBSP) and Viet Nam Bank for Agriculture and Rural Development (VBARD).
- VBARD also has the nationwide network to serve the customers throughout the country.
- According to GSO survey in 2005, 58% of surveyed rural households are customers of VBSP while 23.8 % of surveyed rural households are customers of VBARD.
- They are mainly used as a channel to provide formal credit to farms and poor house holds in rural area.

http://www.bwtp.org/pdfs/arcm/CasestudyVietnam.pdf

Content

Cookstove Industry Summary

Sector Mapping Summary

Vietnam has a large need for health and environmental benefits of cookstoves, but there is still a long way to go to prove the case to the consumer

Macro

- ✚ Large potential market
- ✚ Government recognizes the broad benefits of ICS
- ✚ Cookstoves can alleviate alarming environmental issues of deforestation and emissions
- ➖ Priorities are shifting away from poverty alleviation and towards middle-income development

Moderately Favorable

Social Impact

- ✚ Number of IAP related burden of disease creates a strong case for change
- ✚ Inflation is driving an increasing economic benefit to efficient cookstoves
- ✚ Potential for large associated environmental and gender impacts of renewable fuels
- ➖ Moderate but rapidly decreasing reliance on solid fuels in the countryside

Favorable

Consumer

- ➖ Consumer is more concerned with other priorities and aspires to more than an improved cookstove
- ➖ Biggest need is those difficult to reach and with the least affordability
- ➖ Low willingness to pay for ICS due to no branding or reliable quality standards
- ➖ Consumers demand high utility, convenience, and affordability from their cookstoves

Unfavorable

Cookstove Industry

- ✚ Strong cookstove R&D capabilities with a variety of cookstoves
- ✚ Capable and inexpensive country-wide distribution network with NGOs
- ➖ Strong NGO coordination capability
- ➖ Only a handful of small-scale ICS producers and highly fragmented traditional cookstove market
- ➖ Sales & marketing capabilities not baked into programs

Moderately Favorable

Carbon Finance

- ✚ Active Carbon market organizations
- ✚ No current cookstove-related programs
- ➖ Access to finance is possible in a variety of channels, but it is a lengthy process
- ➖ Losing ability to apply for CDM in 2012

Moderately Favorable

- Implications -

The Vietnam cookstove sector has potential to do a lot of good, but a market-driven industry will need to mature to the point that it can produce, sell, and market to the high-demands of the consumer

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Glossary of Terms

Below is a list of commonly used acronyms used throughout the report and presentation:

CAGR	Compound Annual Growth Rate
CDM	Kyoto Clean Development Mechanism
DALY	Disability Adjusted Life Years
DNA	Designated National Authority
FAO	Food and Agricultural Organization
GDP	Gross Domestic Product
GHG	Green House Gas
GS	Gold Standard
HCMC	Ho Chi Minh City
IAP	Indoor Air Pollution
ICS	Improved Cook cookstove
KTOE	Kilo Tonne of Oil Equivalent
LDC	Least Developed Country
LPG	Liquefied Petroleum Gas
NGO	Non-Governmental Organization
NIOEH	National Institute for Occupational and Environmental Health
PoA	Program of Activities
PPP	Purchasing Power Parity
REDD	Reducing Emissions from Deforestation and Degradation
SME	Small-Medium sized Enterprise
VCM	Voluntary Carbon Market
VND	Vietnamese Dong
WTO	World Trade Organization

Glossary of Organizations

- **ADB- Asian Development Bank**
- **AIPF- Asia Injury Prevention Foundation**
- **ARECOP- Asia Regional Cookstove Program**
- **Bloom Micro- Bloom Microventures**
- **CCRD- Center for Rural Communities R&D**
- **CIFPEN- Civil Society Inclusion in Food Security & Poverty Reduction Network**
- **CSIP- Centre for Social Initiatives Promotion**
- **FSIV- Forest Science Institute of Vietnam**
- **GE Biomass- Green Energy Biomass**
- **Green VN- Green Vietnam Foundation**
- **GTV- Gruppo Trentino Di Voluntariato**
- **GW- George Washington University**
- **HCMUT- Ho Chi Minh University of Technology**
- **HEEAP- Higher Education Engineering Alliance Program**
- **Hoang T- Hoang Thuong MTA**
- **IE- Institute of Energy, part of MOIT**
- **Indochina- Indochina Capital**
- **MARD- Ministry of Agriculture and Rural Development**
- **MFA- Ministry of Foreign Affairs**
- **MOH- Ministry of Health**
- **MOIT- Ministry of Industry and Trade**
- **MOST- Ministry of Science and Technology**
- **MPI- Ministry of Planning and Investments**
- **NACENTECH- National Center for Technological Progress, part of MOST**
- **Nat Econ U- National Economics University Business School**
- **NAV- Nordic Assistance to Vietnam**
- **NIOEH- National Institute of Occupational & Environmental Health**
- **Olivier- Dr. Paul Olivier**
- **Pacific- Pacific Disaster Center**
- **PCD- Pollution Control Division, Part of Ministry of Natural Resources and Environment**
- **PED- Population, Environment and Development Centre**
- **PSBI- Pearl S Buck International**
- **SNV- Netherlands Development Organization**
- **SRD- Center for Sustainable Rural Development**
- **Tay Bac U- Tay Bac University**
- **VCAP- Vietnam Clean Air Partnership**
- **VN CC- Vietnam Chamber of Commerce**
- **VUSTA- Vietnam US Trade Council**
- **WU- Women's Union**

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